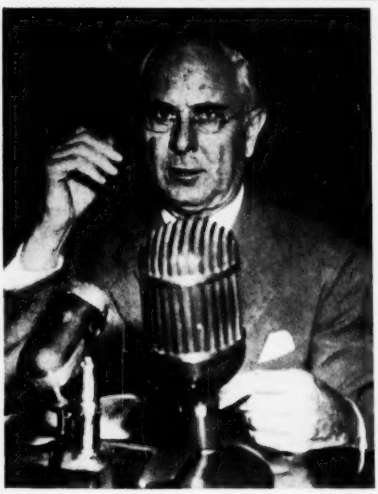
Chemical Week

August 25, 1951 Price 35 cents



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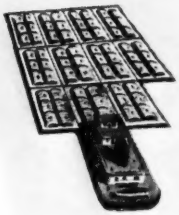

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Chemical Week

Volume 69 Number 8

August 25, 1951

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OPINION . . . . . .

Nightmare Fear

To THE EDITOR: Controls per se are bad enough, but controls based on incomplete data can be a nightmare. Because the men in government bureaus . . . responsible for working out controls are also readers of your magazine, we feel that your attention should be called to an inconsistency in an article "Bisulfide Hard to Garner" that appeared in your August 4th issue . . .

Two facts, known to the industry, have apparently eluded the author of this article, which if known would have modified one of the conclusions.

(1) As much as 90% of the sulfur entering the carbon tetrachloride process as bisulfide is recovered as elemental sulfur. The by-product sulfur from this process is not lost . . . it is returned to the market, usually to the bisulfide maker.

(2) Rayon manufacturers usually demand a high purity bisulfide for use in their process. As a result bisulfide makers usually sell them the highest quality material reserving the off grade material for the manufacture of carbon tetrachloride.

These facts plus . . . the fact that chlorinating hydrocarbons requires twice as much chlorine as the carbon bisulfide route causes us to raise our eyebrows at your suggested alternative.

RICHARD E. HULME
Richard E. Hulme Associates
Bradford, Pa.

Thanks, Reader Hulme. Washington please note.—ED.

Shocking Position

To THE EDITOR: I am shocked at the position that CHEMICAL WEEK and the MCA Committee on Chemicals in Foods are taking in the matter as discussed under "Business and Industry" and "Opinion" in CHEMICAL WEEK July 14, 1951 and August 4, 1951, respectively.

I do not subscribe to this view that "It would set the FDA up as a bureaucratic judge and jury, by-pass the traditional American safeguards of judicial review."

As thinking people know, self-regulation usually amounts to no regulation and it is only when all are regulated to the same degree that there is protection for the public as well as for the legitimate business man. Unquestionably, the greater portion of manufacturers have the public welfare uppermost in their minds, but one has only to look to the record of Notices of Judgments to see that there is a percentage of chiselers and evil-doers still among the whole. It is for protection against this minority that appropriate legislation is always needed.

In the absence of adequate authority for the FDA to cope with the problem before damage is done, there arises a situation paralleling the condition of "locking the barn after the horse has been stolen." This was found to be true in the case of drugs where it took a potential national disaster in the form of "Elixir Sulfanilamide" to shock the Congress into passing the then pending drug bill. In the case of foods the risk is also too great for any chance taking.

To me, this problem resolves itself into one of knowledge. Acquiring knowledge through research is one basic principle of our chemical world. The seeking out of the hidden has never failed to benefit industry, and legislation requiring knowledge first and production second will keep the food and chemical industries on firm ground.

There should be no addition of chemicals to food until substantial evidence for the propriety of so doing is submitted either by the manufacturer or the FDA, or both. Such procedure handicaps no one, since such evidence must be forthcoming to substantiate or refute the charge in case of disagreement.

The courts remain the final authority under the constitution and I fail to see where a law requiring precertification "would by-pass the traditional American safeguards of judicial review."

H. S. PECKINPAUGH,
Principal Chemist
Food and Drug Laboratories
State of Alabama
Montgomery, Ala.

We are shocked too by (1) behind-the-scenes politics and quests for power; (2) the campaign-flavored zeal of the Committee and the error-ridden article "authored" by Rep. Delaney in the American magazine; (3) FDA Chief Crawford's endorsement of the biased, scare-headline Delaney article; (4) the prosecuting attorney character of the "hearings"; (5) the specious thinking which has been labeled as fact in the testimony, has engulfed the truth.

However, Reader Peckinpaugh, even though there is a wide gulf between your opinion and ours, we respect your views, pass them along (in their entirety) to our readers who may hold similar — or contrary — opinions.—ED.

Food Squabble

To THE EDITOR: . . . With reference to your report "Coming: Tougher Food Law" (July 14) . . . I believe that you are rendering a disservice to the industry when you attempt to frighten people with the photograph of laboratory technicians captioned as follows: "Food Research: Potential prey to overweening zeal."

Actually the question involved in this particular chemical in food squabble is a basic one . . . can be summed up about as follows: Are you in favor of testing chemicals *before* adding them to foods?

Those who answer the question affirmatively would benefit those engaged in the chemical profession through creation of more jobs and more facilities for testing chemicals.

Unless this question is answered affirmatively the chemical industry will undoubtedly suffer a black eye with respect to public confidence. Most scientists who earn their living through the food industry are very much concerned about the problem and fear a loss of public confidence if chemical journals continue to crusade for "no testing" or "limited testing" or "testing on the public through use."

I cannot understand how you will define the problem with the statement that "no one really knows how hazardous various chemicals are" alongside the photograph of the laboratory captioned in such manner which threatens the existence of technical men.

NAME WITHHELD

No comment — except that the quotes "no testing," "limited testing," "testing on the public through use" are not from CW.—ED.

To THE EDITOR: . . . Perhaps you've seen the enclosed . . . possibly you haven't. Sounds convincing doesn't it . . . true or not.

H. V. WEBB,
Baltimore, Md.

Thanks, Reader Webb. The enclosure: "Chemicals in Foods, Consumers Report, Aug. 1951.
Theme: "There's an abundance of testimony . . . to prove . . . poisonous chemicals being used in foods."—ED.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: The Editor, Chemical Week, 330 W. 42nd St., New York 18, N. Y.

NEWSLETTER

Now that most of the first-six-months reports are in, it's clear that chemical stockholders have enjoyed a healthy raise in "pay." Cash dividend payments by chemical companies totaled $273 million during the half year—up 15% from last year's $238 million.

Even so, the chemical industry lagged behind manufacturing in general, which gave its owners a 16% raise for the same period.

Higher taxes have whittled away a good chunk of profits, but makers of industrial chemicals turned a neat 23.7% profit (based on stockholders' investment) in 1950. The 1940 return was 14.4%.

Congressional howling about Defense Production Authority's rapid amortization policy led to the start this week of a 60-day moratorium on granting of certificates of necessity.

DPA will use the time for meditation, will probably resume its grants on a more stringent basis. While the review is going on, only "emergency" grants will be made. Some vociferous, anti-business Congressmen contend that DPA has been too liberal—and Congress, of course, controls the purse strings.

Roosevelt Oil & Refining Co. (Mount Pleasant, Mich.) will be first user of the Dow-developed and Universal Oil Products-licensed Udex solvent extraction (diethylene glycol) process for recovery of benzene and toluene from hydrocarbon streams.

Feed stock for the installation will consist of liquids formed by mild hydrogenation of a hydrocarbon cut from plants producing ethylene by thermal cracking.

Another hydrocarbon made news in British Columbia this week: Transit officials of the British Columbia Electric Co. (Vancouver) decided after a ten month's trial that propane is a cheaper and more efficient fuel for buses than gasoline.

Operation is smoother, more responsive, more powerful; and though fuel consumption is 10% higher, oil consumption is 30% less.

But two obstacles stand in the way of converting the 300-bus fleet to propane: first is getting enough fuel at a stable price with regular delivery; second is getting a sulfur-free gas.

Farther south, chemicals are making another automotive contribution. All unpaved roads in Clackamas County, Oregon, will be surfaced with sulfite liquor—like similar roads in Wisconsin (CW, June 9). Cost will be $75-$100 a mile for 16-ft. roads, compared to $525 a mile for oil treatment. Liquor will come from Oregon City, the county seat.

Carbide & Carbon has decided to go ahead with the $5.9-million allethrin plant at Institute, W. Va. (CW, August 11), for which it was granted a 50% rapid write-off.

Large-scale output (500,000 lbs. a year) of the synthetic pyrethrin replacement will undoubtedly lower its cost.

Atlantic Refining Co. has filed for a certificate of necessity to cover a synthetic ammonia plant slated for Philadelphia.

Hydrogen for the plant would be provided by dehydrogenation reactions occurring in its new reforming unit (CIW, Feb. 24).

Canadian Industries Ltd. has chosen a site for its nylon salt plant (CW, June 16). Construction will start in 1953 on a 1,500-acre tract on the St. Lawrence River between Brockville and Prescott, Ont.

Doubling Canada's nylon output, the new plant will make Canada self-sufficient in raw materials, end dependence on imports from U.S.

Carbon tetrachloride and phthalic anhydride are slated to come under NPA's M-32 order. That means that a certain maximum percentage of each producer's output must be set aside for DO orders.

You may see a reorganization soon, incidentally, of NPA's Chemical Division. A plan now under study calls for six subsections rather than the present three. Four would deal directly with chemicals, one with statistics, and one with such correlative functions as containers.

Unabated expansion activity continues this week to characterize Diamond Alkali Co. (CW, Aug. 11):

A multimillion-dollar program at Painesville (Ohio) will more than double Diamond's output of electrolytic caustic and chlorine. Manufacture of caustic by the lime-soda method will be discontinued—in keeping with a long-term industry trend.

Perchlorethylene, now produced by Diamond at Houston, will also be made at Painesville when the two-year program is completed.

The firm's sodium silicate facilities at Dallas will be augmented for the fourth time in ten years with the addition of a fourth furnace. Major growing market: silica gel catalysts. The new furnace will be ready early next year.

Procurement of pharmaceutical and medical supplies for both the Army and civil defense will be centralized in the Armed Services Medical Procurement Agency.

Greater efficiency is a prime aim, but elimination of competition between the country's largest customers is a by-product. Also, the Government can time its placing of orders to minimize the impact on manufacturers and non-Governmental consumers.

Initial purchases for civilian defense under the plan: $40 million—half Federal, half state.

Domestic castor bean crops are lessening the U.S.'s dependence on imports. Texas' first commercial crop (CIW, May 19) is now being harvested. Results are good, and farmers are glad they raised them during current drought, when castor beans and peanuts are the only good cash crops.

The beans are also being tried out in California—in the Antelope Valley desert area of Los Angeles County. Over 800 acres have been planted under supervision of the U. of Calif. College of Agriculture. Early tests show a yield of 1¼ tons per acre.

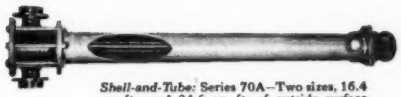
In still another effort to supplant imports, the Army Quartermaster Corps is trying to develop a synthetic black pepper substitute. Research at the Philadelphia Laboratory is progressing successfully. Army's interest: It needs 16.1 ounces per year per man—and nature's product is too costly.

. . . The Editors

"KARBATE" BRAND IMPERVIOUS GRAPHITE HEAT EXCHANGERS *FOR ALL PURPOSES!*

The "Karbate" impervious graphite heat exchangers illustrated are used extensively as boilers, coolers, condensers, vaporizers, evaporators, heaters and absorbers in handling corrosive chemicals, either hot or cold. They *all* can be had in a complete size range. *All of them* offer the following advantages:

- **Highest heat conductivity rate of the practical corrosion-resistant materials.**
- **Highly resistant to corrosion by acids or alkalis, hot or cold.**
- **Freedom from corrosion scale, as compared to metals.**
- **Immune to thermal shock.**
- **No contamination of product.**
- **Strong and easy to install and maintain.**

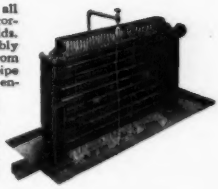


Shell-and-Tube: Series 70A—Two sizes, 16.4 sq. ft., and 24.6 sq. ft. of outside surface area respectively. Tubes easily replaced in the field. Interchangeable single and double-pass construction.

Style FH heat exchangers (Size 1½): Are especially recommended for tanks with solution depths of 16 inches or less. Write for catalog section S-6750.

Series 240A—70.6 feet of outside heat transfer surface. Easy tube replacement. Easily converted on job to single, double, or four-pass tube side flow by simple change of fixed covers. Steel, shell, oversize shell connections, impingement plates and drain and vent plugs integral with shell end castings. Stainless-steel baffles assembled with steel tie rods to form protective cage for tube bundle. Removable "Karbate" tube bundle. Write for catalog sections for S-6690, S-6715 for details of applications, maintenance, sizes and characteristics of these exchangers.

Cascade coolers: For all cooling jobs involving corrosive gases and liquids. Complete cooler assembly may be made quickly from 4 standard items in 5 pipe sizes. Capacity easily enlarged or reduced by adding or subtracting standard sections. Compact construction to save plant room. No special supporting structure needed. Write for catalog section S-6780.



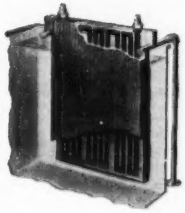
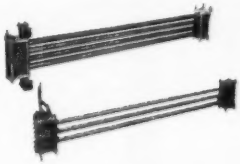


Plate heaters: Used to heat or cool corrosive liquids in tanks and vessels. Compact, completely assembled, easy to put in. Used in pickling, etching, plating and cleaning tanks. Complete size range. Models for horizontal and vertical mounting. Write for catalog section S-6620.



Concentric Tube exchangers: Available in two types. Series 10A is small, low-priced, gives true counterflow. Exceptionally good for small flow rates at narrow temperature differences . . . Series 20A manufactured with "Karbate" inner and outer piping, and is used to transfer heat between two corrosive fluids. Both have sectional construction, can be added to or subtracted from at will. Sturdy, can be moved from place to place after assembly, adapted to any method of mounting on floor, wall, or ceiling. Write for catalog section S-6670.

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A full line of "Karbate" impervious graphite pipe and fittings

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hydroxylamine salts

HYDROXYLAMMONIUM CHLORIDE
HYDROXYLAMMONIUM SULFATE
HYDROXYLAMMONIUM ACID SULFATE

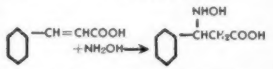
TYPICAL REACTIONS

OXIME FORMATION

$(CH_3)_2CO + NH_2OH \rightarrow (CH_3)_2C{=}NOH + H_2O$

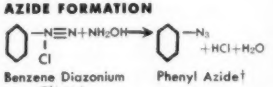
Acetone — Acetoxime

ADDITION AT DOUBLE BOND



Cinnamic Acid — *beta*–Hydroxyamino Cinnamic Acid

AZIDE FORMATION



Benzene Diazonium Chloride — Phenyl Azide†

†Due to the known instability of azide compounds, adequate safety precautions should be observed in attempting this synthesis.

The acid sulfate is the most economical source of hydroxylamine but where a purer product is necessary, the sulfate or chloride is recommended. The chloride is usually chosen for reagent purposes, such as in the determination or removal of aldehydes and ketones because it is the most soluble of the three salts in organic liquids. Therefore, it is also preferred when carrying out syntheses in non-aqueous media.

PROPERTIES

	Hydroxylammonium Chloride	Hydroxylammonium Sulfate	Hydroxylammonium Acid Sulfate
	$NH_2OH \cdot HCl$	$(NH_2OH)_2 \cdot H_2SO_4$	$NH_2OH \cdot H_2SO_4$
Molecular Weight	69.50	164.14	131.11
Melting Point °C	152d.	162d.	Indefinite
pH of 0.1M Aqueous Solution at 25 °C	3.4	3.5	1.6
*Solubility—g/100g at 25°C			
In Water	94.7	63.9	390 Approx.
In Methanol	17.5	0.1	20.2
In Ethanol, 95%	10.5	0.2	4.3
In Ethanol, Absolute	6.6	0.1	6.3
In Butanol	0.6	0.03	2.2

*These Hydroxylammonium salts are only very slightly soluble in ethers, esters, and aliphatic or aromatic hydrocarbons

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BUSINESS & INDUSTRY . . . . .

Again: The Tariff Tangle

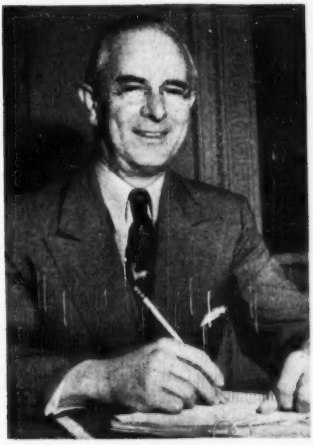
Customs Simplification Bill gets nod from Commerce Secretary Sawyer as cutter of "red tape and costly delay."

SOCMA President Moody voices opposition to bill; tells House Committee it was drafted in "secrecy," would hurt industry.

As chemical importers watched and waited this week, experts of many types testified before the House Ways and Means Committee of the Congress on H.R. 1535, the Customs Simplification Bill. Object of the hearings was to determine whether, and by how much, the Tariff Act of 1930 should be modified.

Secretary of Commerce Charles Sawyer's remarks expressed the theme of those who are in favor of streamlining the twenty-one year old tariff bill. Said Sawyer: "From our (Commerce Department) day-to-day contacts with businessmen, we know that not only those who are primarily importers but also most of those who have anything to do with importing, are agreed that there is too much red tape and costly delay involved in our customs procedures."

Aim of Tariffs: Secretary Sawyer pointed out that many of the present customs regulations stem from early laws that were enacted to protect home industries. Sawyer claimed that although he was in sympathy with "justifiably protective duties", he did not believe that even the strongest believers in tariff protection wish to "get at imports indirectly through the imposition of arbitrary and costly customs procedures which in the final effect, are more harmful to the consumer, the taxpayer and the Government."



SAWYER: In favor of protective duties, but. . . . .

Chemical View: Sawyer's testimony was followed a few days later by that of Sidney Moody, President of the Synthetic Organic Chemical Manufacturer's Association, who presented the views held by a substantial part of the chemical industry . . . *against* the Customs Simplification Bill. The chemical association chief contended: "This bill could well be a matter of life or death for many of our smaller companies." He was also quite critical of what he charged was the atmosphere of secrecy that surrounded the Treasury Department's preparation of the bill.

"American Selling Price": Much of Moody's testimony was directed in defense of the currently used "American Selling Price" method of assessing import duties. He claimed that if it is eliminated and replaced by the export value, foreign value or some other basis which "leaves the foreign producer free to manipulate as he finds necessary . . . a large segment of our domestic market will be thrown open to the foreigner."

The American Selling Price basis for evaluation, explained Moody, takes the "manipulation" power away from foreign producers by basing duties on imports on the selling price of the American-made competitive products.

Outsider Looks In: Light from still another source was shed on the customs streamlining question this week when CHEMICAL WEEK interviewed W. A. Menne, president of Western Germany's Association of the Chemical Industry. Menne, bound home after a good-will tour of American chemical plants, told CW that the present United States customs system is often confusing to the European exporter.

MENNE: Trial shipments seem only way to get the true story.

He claimed that interpretations of customs situations sometimes differ from port to port and many times the only way exporters can learn what a particular duty may be is by sending "test consignments" of goods through our customs system.

The Outcome: At this time, it would be difficult to pick the winner in the spreading debate on customers simplification. Neither the "change-minded" nor the "status quo" contingent will give ground without an argument. But arguments mean words . . . and words take time.

Army vs. Justice

The anti-trust bogeyman has reared its head over negotiations for leasing the Army's Morgantown, W. Va., synthetic ammonia plant, largest of all such war-built plants.

Two bids are being considered by the Army—from Allied Chemical and Dye and from United Distillers. Du Pont, which built and first operated the plant, also has the option to run the plant at the terms agreed between the Army and the highest bidder.

Since Allied—and Du Pont as well—are considered significant producers in the ammonia field, this contract-letting came under the eye of the House of Representatives Judiciary

Committee, zealously championed by Rep. Emanuel Celler, who is carrying on a private war against anything smacking of monopoly.

Hence, when Celler let it be known that an award to Allied would establish a "trend" toward monopoly, the Army asked the Justice Department for a ruling on the question. Justice replied with a paraphrase on present anti-trust legislation, passing the buck right back to the Army. Now, Justice has been asked specifically if awarding the contract to Allied would, as Celler put it, constitute such a trend.

Du Pont's involvement in the affair has not figured quite so prominently as has Allied's, though both could be affected by any anti-trust pronouncement.

Army's Undersecretary, Archibald Alexander, doesn't want to take any step which will jeopardize his department's relations with the violent anti-trusters in Congress. This means that negotiations over the plant, which already have lasted for 10 months, may last a while longer.

Industry and Morgantown: In the past, manufacturers have been reluctant to lease the West Virginia plant because of its relatively high operating cost. Where most synthetic ammonia plants use natural gas as a hydrogen source, Morgantown is set up to use hydrogen from a coking process. The Army, though, has been considering adding equipment so that either process could be used.

The plant, built by Du Pont at a cost of $75 million, produced ammonia and methanol throughout World War II. It was closed after the war, but later Heyden Chemical operated it for the Army to produce fertilizer for Japan and Western Germany. Since this program ended, the plant has remained idle.

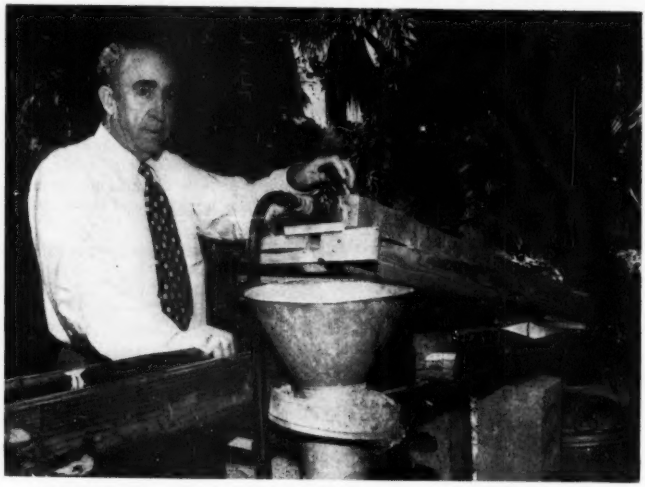
The first time the Army called for bids, there were no takers; only now —on the second call—were two bidders found.

Average yearly production of the plant was 164,000 tons, on a nitrogen basis; though at one time it was producing at a 204,000-ton rate. Government officials have stressed the need for getting the plant back into operation, since the cost of constructing new facilities would be much greater than that when this plant was built. New plants would not only take goodly quantities of controlled materials, but also require close to two years time to complete.

Need for Facilities: A comparison of consumption of fixed nitrogen in fertilizer shows how much the use of nitrogen compounds has increased. The average yearly use of nitrogen in fertilizer for the years 1935-39 was 371,000 tons, while during the fiscal year ending June 30, 1.3 million tons were used—up 20% from 1949-50.

The Morgantown facilities were included in the ten plants built during the war for production of synthetic nitrogen derivatives and other compounds. One of these, at Muscle Shoals, Ala., is operated by the TVA; the other eight are now either owned or operated by private industry.

These include Phillips Chemical's Etter, Tex., facilities; the Sterlington, La., plant of Commercial Solvents; Mathieson's Lake Charles, La., plant; the Pittsburg, Kans., and Henderson, Ky., operations of Spencer Chemical; and Lion Chemical's El Dorado, Ark., facilities. The South Point, Ohio, plant is already operated by Allied, while the equipment originally at Louisiana, Mo., is now set up at San Jacinto, Tex.



DISCOVERER PRITCHARD: Remove the waste sand where it is mined.

Point of No Return

An ever-present problem in recovering such minerals as ilmenite, rutile, zircon and monazite from beach sands is that the mining operations tend to recede farther and farther away from the separation plant—to the point of "no return." The huge amount of material of no value that must be hauled to a central concentrating plant soon pushes haulage costs up to unprofitable levels.

Florida Ore Processing Co.'s concentrating plant near Melbourne, Fla., now gets sand from as far away as 18 miles for separation of heavy minerals by electrostatic and electromagnetic means.

Now George A. Pritchard, of Atlantic Beach, Fla., has recently developed and successfully demonstrated to the company a sand classifier and flotation separator which will cut down the cost. The device is small and can be easily moved to the mining site. In operation on a Florida beach sand which averages 4-6% heavy mineral, seashells and the greater part of the sand—50-80% of the bulk—are removed. Haulage costs to the processing plant are correspondingly reduced.

Old Hand: Pritchard is an old hand at processing beach sand to recover and separate heavy minerals. He not only discovered sand deposits on the Indian River, but organized a company and set up an ore processing plant of which he was part owner and general manager from 1940 to 1946. In 1946 he sold his interest. The operation is now headed by Frederick A. Hauck of Cincinnati.

The Melbourne operation, incidentally, was not Pritchard's first fling at utilization of Florida sands. He, with Henry H. Buckman of Jacksonville, Fla., first discovered the existence of the mineral-bearing Florida beach sands.

By Chance: Discovery of the mineral content of the sands came about both by chance and some persistent detective work by Buckman and Pritchard.

Before World War I they were part-

ners in a consulting engineering and metallurgical firm, were also manufacturing paint in Indianapolis, Ind. On one occasion, when the two were melting copper in a Buckman-designed electric metal-melting furnace, the surface oxidized too rapidly. Pritchard picked up a box of sand obtained by Buckman for making experimental cement blocks, threw it on the surface of the molten copper. Some sand stuck to his sweaty hands and he observed to his skeptical partner that it showed signs of mineral content. Next question: "Where did it come from?" To further complicate matters, the man who shipped the sand had left the country.

Meanwhile a sample of concentrates was forwarded to the Bureau of Mines for analysis. The result: Large quantities of ilmenite, an iron-titanium ore, were present.

Sand Hunt: This result sent the two off on a sand hunt along the southern Atlantic beaches. Sands from Charleston, S.C., to Miami, Fla., were sampled by spectroscope. The most abundant mineral source was sand from what is now Ponte Vedra Beach, a few miles south of Jacksonville.

Incorporated as Buckman and Pritchard, the two men produced enough concentrates to interest the Titanium Alloy Mfg. Co., which was just starting to develop titanium dioxide pigments. Titanium Pigments Corp., now owned by National Lead, soon emerged.

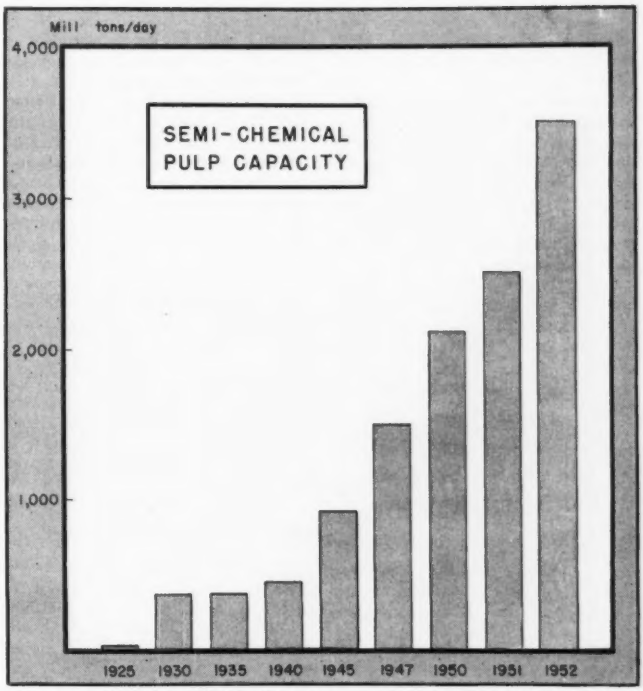
Commercial production started in 1916 and the pair sold out to National Lead in 1922. This deposit produced for years and was sold in 1942. Since then National Lead has operated a sand mine, also discovered by Pritchard and his associates, a few miles west of Jacksonville Beach.

Pritchard has been associated with the development of titanium pigments from the beginning, and the new separator adds still another feather to an already well-feathered cap.

Semi-Chemical Gains

Eleven expansion projects, now in the works, will boost daily output of semi-chemical pulp from its present 2,500 tons to 3,500 tons. Indicating a solid trend, it adds up to a fourfold increase over a five-year period. Reason: more economies through higher yields and utilization of hardwood species.

The process has an added attraction for phenol-resorcinol producers, since it uses large quantities of by-product sodium sulfite from processes employing sulfonation followed by caustic fusion.



PULPING TREND: Slow start, second wind, sharp climb.

It has a dollar-and-cents appeal for the paper industry, too. High (up to 85%) yields are especially significant in these times of high pulpwood prices. Another factor that argues for the process is that it permits an appreciable reduction in stream pollution.

Utilization of hardwood species is equally important from the monetary standpoint. In many pulp producing areas, hardwoods are available in surplus while softwoods are at a premium. In most areas, supplies of straw and waste paper are inadequate and expensive. Semi-chemical processing supplies the needed economic balance in demand.

Since the boom began, semi-chemical tonnage has passed that for soda pulping (560,000 tons, 1950), may eventually replace the process altogether. Semi-chemical pulp can be used in mixtures with groundwoods, softwoods and other hardwood pulps to manufacture a variety of paper products. This flexibility of use will continue to boost capacity until it equals or surpasses groundwood production (2.5 million tons, 1950) and assumes a role among the leading pulp processes.

Present leaders are sulfate (8.4 million tons, 1950) and sulfite (3.3 million tons, 1950). At a million tons a year, semi-chemical tonnage will soon be one-third sulfite tonnage.

National: One company that is taking advantage of the process is the American Paper and Pulp Co. (Filer City, Mich.). Formerly, it had been paying high freight rates for Canadian jack pine. Now it is using a supply of aspen growing practically in its front yard. In addition, it has been able to shut down strawboard operations entirely.

Waldorf Paper Products (St. Paul, Minn.) has also been able to discontinue the use of straw. Other companies in the Lake States area to hop aboard the semi-chemical bandwagon include: Green Bay Paper and Pulp Co. (Green Bay, Wis.), Ostego Falls Paper Co. (Ostego, Mich.), Cornell Wood Products Co. (Cornell, Wis.) and Watervliet Paper Co. (Watervliet, Mich.).

Two large installations have been made by Union Bag and Paper Co. and the Southern Kraft Division of International Paper Co. Hardwood semi-chemical corrugating board is already considered a quality standard in its field. And operation in conjunction with a kraft mill gives a balanced woods operation. It also permits the

utilization of semi-chemical spent liquor in the kraft mill recovery system.

International: The process is catching on in Canada too. Abitibi Power and Paper Co. has built a mill in Sturgeon Falls (Ont.); Bathhurst Power and Paper Co. has one in New Brunswick producing semi-chemical pulp as a substitute for softwood kraft pulp and waste paper. Both mills use local hardwoods.

Semi-chemical mills are in operation, under construction, or planned in France, Germany, Sweden, Finland and Japan.

Slow Start: Semi-chemical processes were developed by the U.S. Forest Products Laboratory (Madison, Wis.) in 1925. The process gained some early acceptance, then production leveled off. In 1945, the idea second-winded, now seems destined for even bigger expansion.

The process consists of a mild cooking (170 C for 1-3 hrs.) to impregnate and soften the wood. This removes about half of the lignin and some hemicelluloses. Then mechanical milling in a disc-type attrition mill removes the balance of the natural cements.

The unbleached pulp can be used for coarse papers, but finer grades require bleaching. Corrugating board is currently taking the bulk of semi-chemical pulp but a trend toward diversification of products is gaining favor.

Consolidated Water Power and Paper Co. and Watervliet Paper Co. are now producing bleached pulp for fine papers and other companies are planning similar operations. Successful experimental runs have been made on wrapping papers, papers for book matches and bottle caps, coated magazine paper, coated cover and playing card stock. Plans are currently under way for the commercial production of glassine papers. Waxing, liner-board and bond papers are being considered.

Metal Allotments up

Chemicals are coming in for a lot more copper and aluminum under fourth quarter allotments of the Controlled Materials Program, effective in October. Compared to the third quarter of the year, copper allotments will be up from 172,000 lbs. to 1 million lbs., and aluminum up from 3,322,000 to 8,135,000 lbs.

These increases are not as startling as they might seem at first glance. Products considered by NPA as "type B"—those essential to defense, and hence eligible for scarce materials allotments—have shown a large increase between the two quarters.

During the July-September period the only chemical users of copper and aluminum considered to be essential are these producing marine paints and metallic paints. But come October, a raft of new items will join the essential list. These will include: aluminum chloride and other copper- or aluminum-containing chemicals; drain-pipe solvents; caulking compounds; inks for gravure, lithographic and offset printing; chemical catalysts; copper-containing insecticides; plastics that use copper or aluminum; and signal fireworks.

High as the new figures are, they do not include allotments for chemical plant expansion or equipment. If these were included, the figures would be much higher.

Slow Sulfur Pick-up

(U. S. concern over British sulfur supplies prompted CHEMICAL WEEK *to cable its London Bureau for an on-the-spot appraisal. This week we received Bureau Chief Nat McKitterick's reply. —*ED.*)*

The British sulfur situation can't be much easier by 1954; in three years Britain will still need an estimated 300,000 annual tons of U.S. brimstone (today it's 408,000 tons). That's the opinion of British government officials. But the British may be overly pessimistic—and for a good reason: It's cheaper to use U.S. brimstone than push sulfuric acid production by way of pyrites, anhydrite, and oxide recovery.

More than 75% of Britain's elemental sulfur consumption goes into sulfuric acid. To lighten the future import load, it is shooting for a sevenfold boost in acid from pyrites and a substantial increase in production from anhydrite. But the British don't think this ambitious program will fill the entire bill.

If the total consumption remained at the present level of 1.9 million tons a year, the estimates might cover the entire deficit by 1954. However rearmament is expected to increase acid consumption at the rate of 200,000 tons a year, or half the proposed increase. On this basis, the deficit will only be reduced about a third by 1954.

One major obstacle to full-throttle sulfur expansion is a very real shortage of construction materials. And there is no evidence that new sulfur capacity will be given enough priority to bridge the entire gap. One Labor Government official put it on the line: "If we give new sulfur schemes a very high priority for materials, something else just as important will have to give way."

Anhydrite Score: By 1954, the increase in acid production from anhydrite promises to be little more than 50,000 tons. Imperial Chemical Industries' plant at Billingham will bear the brunt of this expansion. It now produces 150,000 tons of acid annually; next year it is aiming at 175,000 tons; the target for 1954 is 200,000 tons of anhydrite acid. United Sulfuric Acid Corp., recently formed by eleven leading British acid consumers, will add 150,000 tons with the completion of a new $10-million plant. ECA, however, doesn't believe this plant will be in before 1955.

Spent oxide recovery, which accounted for 17% of Britain's acid last year, offers quicker returns. Esso Petroleum, Shell Petroleum and Anglo-Iranian Oil Co. plan to add recovery units to their British refineries. In addition, Esso intends to put up a

Current List of DPA-Certified Chemical Facilities

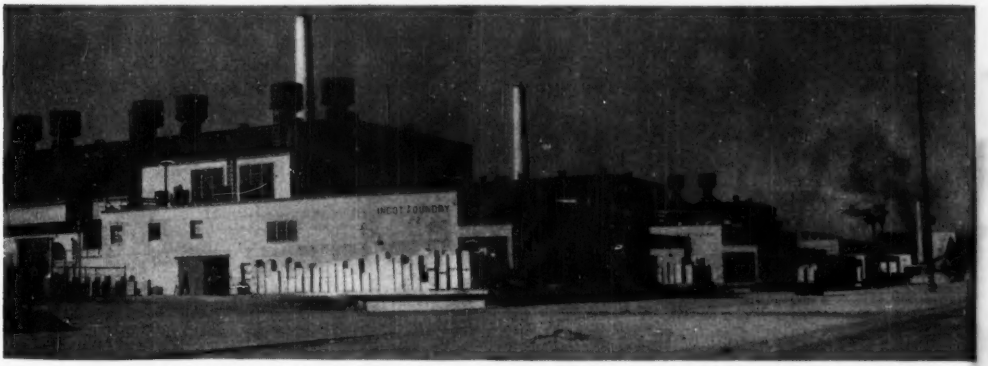
COMPANY	LOCATION OF FACILITY	PRODUCT	AMOUNT ELIGIBLE	PERCENT
Norton Co.	Worcester, Mass.	Alundum abrasive	$226,100	75
E. I. Du Pont de Nemours & Co.	Deepwater, N. J.	Tetraethyl lead	2,883,000	85
do	do	do	497,000	40
Great Lakes Carbon Corp.	Electrode Div., Morganton, N. C.	Graphite electrodes	4,500,000	75
The Dow Chemical Co.	Bay City, Mich.	Magnesium alloy	225,700	75
Michigan Abrasive Co.	Detroit, Mich.	Coated abrasives	504,770	75
Eli Lilly & Co.	Indianapolis, Ind.	Penicillin	4,769,564	60
Schenley Distillers, Inc.	Lawrenceburg, Ind.	Penicillin	433,130	65
A. P. Green Fire Brick Co.	Mexico, Missouri	Refractories	963,648	85
Kaiser Aluminum & Chemical Corp.	Baton Rouge, La.	Alumina	16,500,000	80
Kaiser Aluminum & Chemical Corp.	New Orleans, La.	Aluminum pig	75,000,000	80
Reynolds Metals Co.	Saline County, Arkansas	Alumina, cryolite and aluminum fluoride	2,524,407	80
Lameso Cotton Oil Co.	Lamesa, Texas	Cottonseed oil	62,000	45
Stauffer Chemical Co.	Richmond, Calif.	Oleum	52,000	80
Stauffer Chemical Co.	Compton, Calif.	Sulfuric acid	57,070	80
Norton Co.	Stamford, Ontario, Can.	Aluminum oxide abrasive	295,400	75
Norton Co.	Chippawa, Ontario, Can.	Aluminum oxide abrasive	705,000	75
Kaiser Bauxite Co.	Jamaica, British West Indies	Bauxite	2,000,000	80

12,000-ton recovery plant by 1953.

The Spanish Question: More acid from pyrites will take a lot of doing. If the sevenfold increase from this source is to be accomplished, the British will have to import 700,000 tons of pyrites a year as against the 200,000 tons they now take. Spain supplies Britain with 90% of its imported pyrites and it's no secret that Spanish production is in a bad way—almost 1.5-million tons below the pre-World War II peak.

ECA has indicated it would be willing to bolster Spanish pyrites with aid money. The British would have to make some investments of their own to jack up sagging output. But even with substantial improvements, the British are uneasy—they just don't trust Franco. They fear the Franco government will play fast and loose with pyrites in future trade talks, ask higher and higher prices and greater *quid pro quo* in scarce copper sulfate, ammonium sulfate and steel.

The British have a very good alternate source of pyrites in Cyprus, but they don't talk much about this. Last year they took comparatively little from this source; the bulk of the island's output went to France and Italy. Some British officials claim that the copper content of Cyprus pyrites is a deterrent to more complete utilization. But it's more likely the British have been saving the Cyprus supply as a trading inducement while relying on U.S. sulfur and cheap Spanish pyrites to meet home demand.



HENDERSON PLANT: From World War II's magnesium plant, a big boost for titanium.

Tons of Titanium

Entry of four companies into the field and the development of one new process attest to the increasing activity in metallic titanium. Now Titanium Metals discloses that its conversion of the Government-owned magnesium plant in Henderson, Nev., will boost titanium production by an annual rate of 3,600 tons in late 1952.

It's no news that Titanium Metals will take over the magnesium plant operated in World War II by Basic Magnesium. National Lead, joint owner (with Allegheny Ludlum) of Titanium Metals, has had a long-standing interest in the plant. Last year it submitted a bid for a lease *(CI, Feb. 1950)* and in June, Titanium Metals received a $14 million certificate of necessity for producing titanium there.

It was not until last week, however, when the General Service Administration signed a letter of intent, that the company revealed the scope of its plans—said the titanium facilities will occupy "major components" of the $150-million plant. Using the Kroll process (reduction of titanium tetrachloride with molten magnesium), it is scheduled to be in production by the end of this year, will hit the 3,600-ton annual rate by late next year. That is the immediate goal; eventual capacity may run even higher.

Raw material for the plant will be rutile from National Lead's Florida deposits and Australian supply sources. Adequate power for the project is assured as the result of signed contracts calling for 151 million kwh per year from the Hoover and Davis dams.

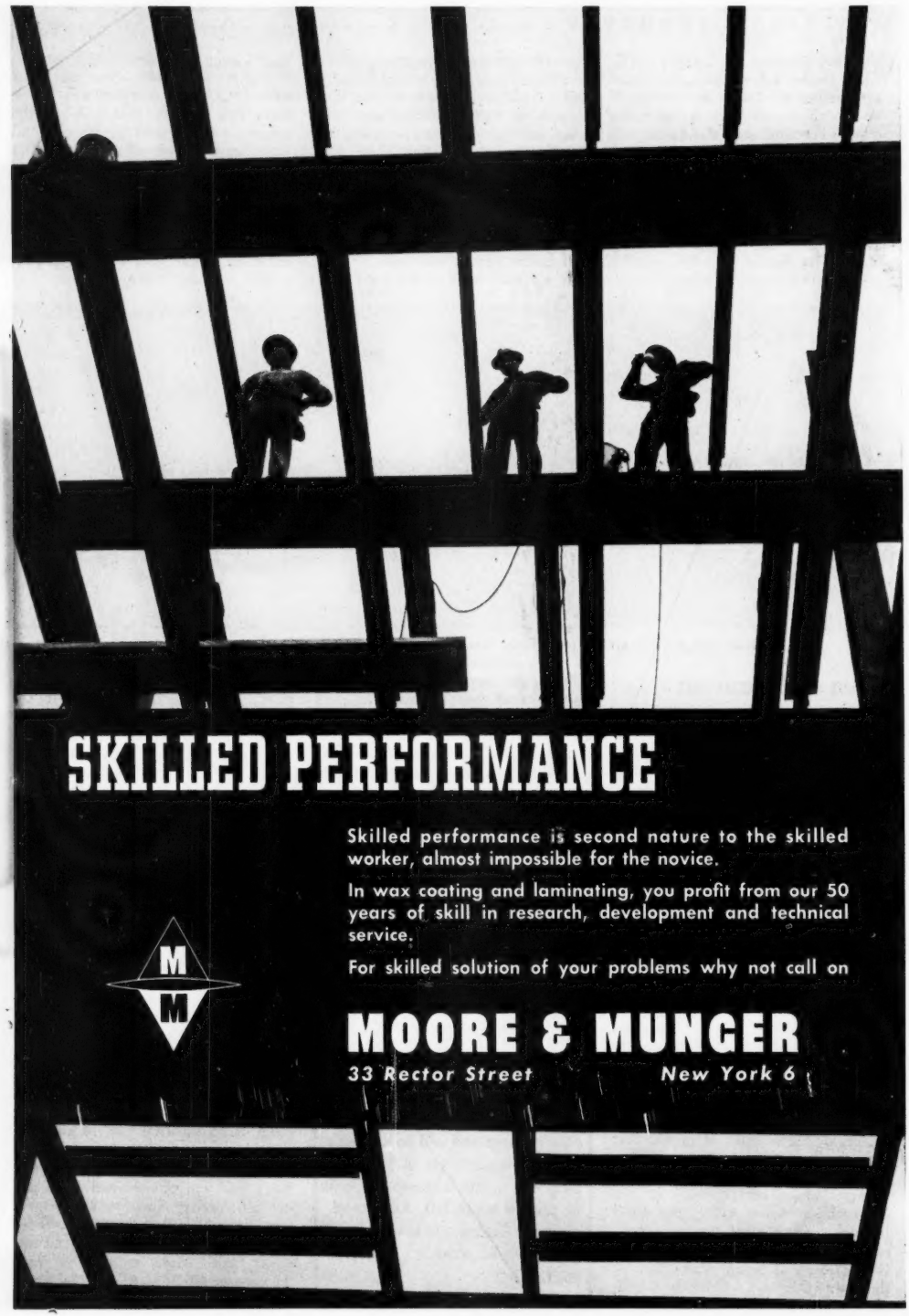
The significance of the project is that it will for the first time establish titanium production in the thousands-of-tons class. It also means that Titanium Metals will be well on top of the heap as far as tonnage output is concerned.

CHEMICAL WEEK reported that the industry would produce 500 tons in 1951, but was shooting for a 5,000 ton rate by the end of next year *(CW, June 16)*. Du Pont, the other big producer, is currently pushing its new unit in Newport, Del., in order to reach a 600-ton rate by early 1952. Du Pont is close-mouthed on any additional plans; but it has been carefully nursing the infant metal, and it's a safe bet that expansion plans are in the works.

Much Ado: Details on capacity by Titanium Metals climax a period of unprecedented activity in titanium. The first move was Crane Co.'s surprise decision to enter the field by building a ton-a-week pilot plant.

Shortly afterwards, Monsanto teamed up with National Research Corp. (a pioneer in titanium research) to intensify development of the metal. And almost simultaneously, Horizons Inc. developed a new process for producing titanium. With Ferro Corp. (Cleveland), it formed a new company, Horizons Titanium, to give the process a pilot-plant trial.

A week after Horizons' action, the Navy said the process had been developed under Navy contract, and that it would cut production costs by 80%. This presumably meant that the selling price could be reduced from the present $5/lb. to $1/lb. The Navy added that Horizons had discovered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In wax coating and laminating, you profit from our 50 years of skill in research, development and technical service.
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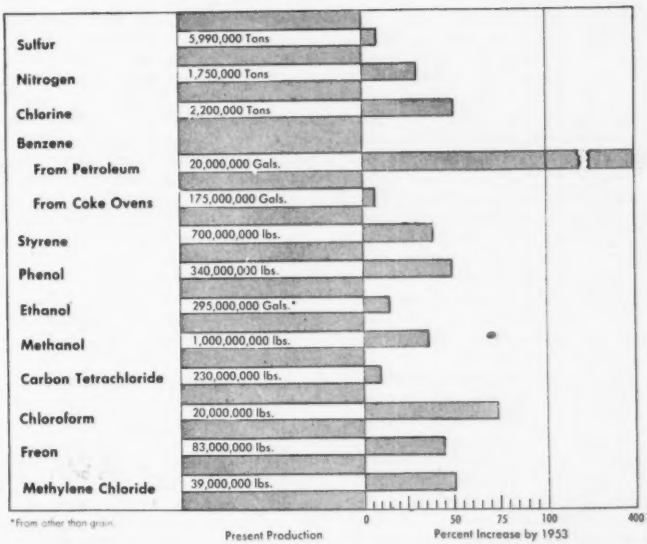
"what everyone else had been seeking."

This immediately led to speculations that the process was either an electrolytic or thermal reduction. Horizons, however, will neither confirm or deny the Navy's cost estimates, says only the process is a "novel" one, is not a modification of the Kroll method. It adds that cost estimates will have to await successful production on a pilot scale.

Experts' reactions to the Navy's statement: "Interesting if true." And even if the process does prove a satisfactory method of turning out low-cost titanium at sufficiently high purity, it will be some time before it can have any commercial impact.

For the present, the emphasis is to reduce costs by increasing production. Titanium Metals, for instance, thinks it can pare the present price when the Henderson plant hits its stride. It is doubtful, however, that dollar-a-pound titanium will ever be made by the Kroll process.



Expanding—But Still Short

Basic chemical expansion figures, released in Washington this week, are giving shape to the industry picture for 1953. Calculated from the number of requested rapid amortization certificates, the government figure of $1.8 billion is admittedly too low. Nevertheless, shortages are in the offing.

More inclusive estimates, from experts contacted by CW, take the government's figures and add additional expansions, not certified, but admitted by usually close-mouthed industry men. The result is a $2 billion estimate for basic chemicals expansion. But with demand for these materials soaring, it is almost certain that the figure will be revised upward before 1953.

The certification yardstick is obviously a short one. Many companies are expanding without benefit of rapid write-off, and many that applied for the write-off, but were turned down, are going ahead with the planned expansion anyway.

Great impetus to basic chemical expansion stems from the mobilization program. These basic chemicals are a must for nearly every operation producing vital defense materials. Synthetic rubber and aviation gasoline, for example, lean heavily on benzene. And more steel means more sulfuric acid needed.

This gives chemical expansion a high priority rating in Washington. Certification of basic chemical plants has been heavy *(CW, August 4, 1951)*, and a certified chemical plant is virtually assured supply of such critically short materials as structural steel.

Shortages: But it doesn't mean that the industry hasn't its share of shortage headaches. Nickel is already pinching painfully, and in its own backyard a tight supply of sulfur is developing. While the nickel bottleneck will apparently be broken soon, the sulfur situation is particularly cheerless. The more pessimistic sources see a short supply of sulfur for a long time to come. Present planned expansion is considered too low to meet the demand by 1953 by nearly 300,000 tons. The government is urging industry to rely more on pyrites for sulfuric acid production, but this involves costly new processing and new equipment.

Nitrogen also appears to be headed for shortage, although not as seriously as sulfur. It is expected that by 1953, at present expansion figures, demand will exceed supply by some 200,000 tons a year. Also running behind estimated future demand are known expansion plans for phenol, synthetic ethyl alcohol, and several other critical items.

Higher Estimates: It is possible that the expected even higher estimates than $2 billion for chemical expansion will take the form of relieving some or all of these impending shortages. Since figures industry is keeping under its hat can't be added, considerable expansion may be unaccounted for. But at present, expansion figures support a forecast of many chemical shortages by 1953.

Fluoride Fracas Stirs West

The fight over fluoridation grows hotter in Northern California and promises to influence action in municipalities throughout the nation. Asserting that the process is neither forced medication nor the addition of rat poison, a citizens committee has been formed in San Francisco to fight for fluoridation of that city's water supply. The issue will be resolved late this fall by a referendum. It is the committee's hope that, given the facts, the people will vote "Yes."

On April 16, after more than five months of investigation, the San Francisco Board of Supervisors, voting 9-2 in favor or fluoridation, passed the necessary enabling ordinance. On May 7 an initial sum of $40,000 was appropriated from water department funds for the project. By that time, however, strong opposition on the part of the Christian Science Church had developed *(CW, July 7)*. Four supervisors petitioned to place the subject on the November ballot as a matter of public policy.

While the Public Utilities Commis-

sion has a legal right to go ahead with its work on test fluoridation of some 40% of San Francisco's water supply, it nevertheless feels obligated to await the popular vote. As a result, all operations on the project have been suspended, but plans and paper work will be continued to insure the least waste of time. If approved by the people, fluoridation will start as soon as possible in the Richmond and Sunset districts, which contain the majority of San Francisco's children.

Thus far almost all opposition to fluoridation has stemmed from the belief of the Christian Science Church that the process is forced or mass medication and thus violates the constitutional right of the Church to practice as it sees fit. In a statement published April 15, the Church states that "we make no objection to legislation requiring medical treatment provided the legislation respects the constitutional guarantee of freedom of religion and grants exemption from treatment for those who rely on prayer or spiritual means for healing. But when it is proposed that a therapeutic agent be administered through the water system where there can be no possibility of exemption, we necessarily oppose such action."

No Such Thing: In rebuttal, the Judicial Council of the American Dental Association points out that the process is one of prevention—not medication—and is in principle much the same thing as chlorination. It is important to note that in order to help resist tooth decay the fluoride must be absorbed by the body prior to final formation of the permanent teeth, around the age of 10 or 11, and preferably during the pre-natal stage. Dental caries once formed are unaffected by water-borne fluoride treatment.

The first round in the current battle was won by the Church when it successfully opposed a bill in the California legislature that would have permitted introduction of fluorine compounds into public water systems. If passed the bill would have relieved local communities of legal responsibilities arising from fluoridation, but would have had no real effect on the fight that has developed in San Francisco. As the situation stands now, any community has the right to accept or reject fluoridation as it sees fit.

A compromise bill, passed by the legislature and signed by Governor Earl Warren, authorizes addition of fluorides to bottled water offered for sale as drinking water. A quick check by CW revealed bottling companies split about even as to their action under the new law. Some feel that most communities will add fluorine to their water supplies sooner or later, and private water suppliers would best serve those who either don't want fluoridated water at all, or don't want to pay the slight additional cost for fluoridating bottled water. Other companies take the opposite view, were instrumental in getting the legislation passed in the first place. One company already has the necessary proportioning equipment and will offer fluoridated water as soon as it gets the green light from the Food and Drug Administration. All that is required is proof that the fluoride can be held at a definite concentration.

Small Cities Lead: The Scientists' successful lobbying in the legislature had repercussions in the capital city of Sacramento itself, where fluoridation has been held up pending further study. At the same time, following the nation-wide pattern that shows cities and towns under 100,000 taking the lead, the small (22,000) coastal city of Santa Cruz, some 65 miles south of San Francisco, has passed an ordinance providing for fluoridation. In doing so, its council overcame much the same opposition tha thas plagued Sacramento and San Francisco.

Twenty-one states now sanction fluoridation, while eleven others have given it their approval and will start the program in one or more communities in the near future. San Francisco, however, is the first large city to tackle the subject. Other major cities throughout the nation are watching its fight with an eye to their own problems.

A previous referendum on the subject was held last September in Stevens Point, Wis. At that time fluoridation was defeated although the program had been in operation for over six months. There the opposition came not from the Christian Scientists but from a misguided segment of the population which claimed sodium fluoride poisoned the water. Aware of the identification between fluorides used in fluoridation and those used in commercial poisons, the chemical industry has been active in searching for a less toxic fluoridating agent than sodium fluoride and fluorosilicate. The Ozark-Mahoning Co. has been investigating the use of Flural (a fluorine-containing alum) for both fluoridation and flocculation. Flural is one eighth as toxic as sodium fluoride and if found practical its dual purpose may even reduce the cost of fluoridation from the 10-15¢ per person per year.

At the beginning the issue was not taken seriously by many Stevens Point voters, but by the time the referendum was held, enough suspicion had been sowed to raise doubts in the minds of many people. A similar defeat, even on supposedly more enlightened grounds, in a major city like San Francisco would be disastrous to the entire fluoridation program. And further cries of "rat poison," already being heard in California, can do no good to the reputation of the chemical industry.

FOREIGN. . . . . .

Canada: First major production of sulfur from iron pyrites for the pulp and paper industry is now being tried out in British Columbia by the Columbia Cellulose Co., Ltd. at its Port Edwards plant. The company is reported to be planning a plant at the mill to use iron pyrites from the Britannia mine.

The pyrites, which form a huge pile at the Britannia Mining and Smelting Co. operation on Howe Sound, contain about 50% sulfur. Britannia has a pile of 100,000 tons of pyrites, is adding to it at a rate of 200 tons a day.

EXPANSION . . . .

Great Lakes Carbon: A new company, British-American Carbon Corp. has been formed, as a joint venture, by Great Lakes Carbon and Powell Duffryn Carbon Products, Ltd. The new firm will produce and market carbon and graphite products used in the chemical process industries. It will be the sole U. S. producer of carbon and graphite made by Powell Duffryn's Delanium process. Both parent companies say the joint enterprise looks like a good method for diversifying activities in the graphite field.

•

Dow: Construction is slated to start next fall on new research facilities at Midland, Mich., and Freeport, Tex. At Midland, new labs and a new library will be built; at Freeport, an eight-building research center. Total cost: $4.5 million.

KEY CHANGES . .

Carleton Ellis, Jr.: To director of sales, Plaskon Division, Libbey-Owens-Ford Glass Co.

John E. McKeen: To honorary member, American Institute of Chemists.

John E. Kircher: To manager, Petrochemical Department, Continental Oil Co.

Frank J. Soday: To director of research and development of synthetics fibers, Chemstrand Corp.

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U.S.I. CHEMICAL NEWS

August 25 ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1951

ATTENTION

Users of Taxfree and Specially Denatured Alcohol

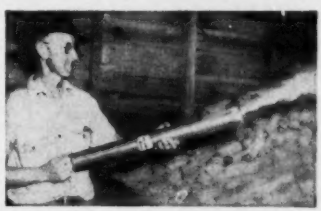
Now is the time for users of specially denatured alcohol to renew their basic permit (Treasury Department Form 1479) for 1952. It is also time for users of Taxfree alcohol to complete and file with the District Supervisor—Alcohol Tax Unit—their application (Form 1450) for renewal of their Taxfree Alcohol permit for 1952. If you require forms or any assistance in their preparation, please call your nearest U.S.I. office.

Pyrenone Grain Protectant To Help More American Farmers Save Their Stored Grain

Unique Insecticide Material, Introduced Last Year, Gives Full-Season Protection with One Application

U.S.I's 1951 program for Pyrenone Grain Protectant, introduced on a limited basis last year, will bring these unique materials to many more of America's farmers and grain handlers who are fighting costly insect damage to their stored grain. Efforts will be especially concentrated in the South where, because of high temperatures favorable to insect breeding, infestation problems are most serious.

In 1950 Southern farmers lost nine per cent of their stored corn to insects each month by U.S.D.A. estimate. That means about an 80% loss over a nine-month storage period. Pyrenone Grain Protectant offers an entirely new way to beat insects — by preventing development of insects rather than killing an infestation after the grain is damaged. Applying



Applying Pyrenone Grain Protectant to shucked corn with a hand dust gun. No other equipment is needed — no masks, gloves, or special safety precautions.

it to grain at time of harvest means clean, top-quality grain when the time comes to sell it or feed it to livestock. One application is sufficient for an entire storage season.

Non-Toxic

The regulatory authorities concerned with foods and feeds recognize Pyrenone Grain Protectant as non-toxic to warm-blooded animals. Safe for use on grain for feeding to animals and also for milling into meal, flour, or other cereal products, Pyrenone Grain Protectant has no effect on taste or odor of finished products or on baked goods made from them. No special safety equipment is needed to apply the Protectant because it presents no added danger of explosion, fire, or poisonous fumes. Unlike fumigants, the Protectant works perfectly in open cribs.

Tests Highly Successful

At Greenwood Farms, Thomasville, Georgia, 800 bushels of hybrid seed corn (shelled) were treated in August, 1949. As late as June, 1951, this corn was in perfect condition. Other corn in a similar crib which had not been treated was removed after a few months, because it was very badly weevil-infested. On November 9, 1950, 50 bushels of shucked corn were treated at Thomasville and at the same time, fifty bushels of untreated corn were

MORE

Methionine Enhances Effect Of Antibiotics in Animal Feed

Improves Both Growth and Feed Efficiency

Data are now available from an Eastern university's recent tests on the relative growth responses obtained when DL-methionine, an antibiotic and fish meal are added in various combinations to a corn-soybean ration. Each test group was composed of twenty New Hampshire chicks of mixed sex.

Growth Response of Chicks as Influenced by Supplements to Corn-Soybean Meal Ration

Group	Supplement	Av. Wt. at 8 wks. gms.	Feed Efficiency
1	None	786	3.20
2	0.1% Methionine	831	2.96
3	10 ppm procaine penicillin	813	2.78
4	0.1% Methionine + 10 ppm procaine penicillin	908	2.88
5	5% Fish Meal	880	2.93
6	5% Fish Meal + 10 ppm procaine penicillin	883	2.94
7	5% Fish Meal + 0.1% Methionine	869	2.95
8	5% Fish Meal + 0.1% Methionine + 10 ppm procaine penicillin	902	2.82

These data show that addition of methionine to the corn-soybean ration improved both growth and feed efficiency (group 2). Addition of an antibiotic to this same type of ration also gave more favorable growth and feed efficiency figures (group 3). A combination of 0.1% methionine and 10 parts per million of procaine penicillin gave a growth response (group 4) equal to or greater than that obtained when 5% fish meal was added to the diet (group 5).

Test results showed that in some instances addition of antibiotics and DL-methionine alone can give results comparable to those obtained when any combination of fish meal, methionine, and antibiotics is added to a corn-soybean meal ration. This would seem to indicate that addition of an antibiotic to a corn-soybean ration containing methionine may permit the intestinal flora to synthesize any unknown growth factor present in fish meal.

As feed manufacturers depend to a greater extent on vegetable proteins in their

MORE

Titanates Are Vehicles For High-Temperature Paint

Butyl titanate and other esters of titanic acid are reported to be showing promise as vehicles for high-temperature paints. Used alone as a coating, butyl titanate does not dry in the manner of most conventional paints, but hydrolyzes rapidly to brittle, non-adherent titanium dioxide. When inorganic pigments are incorporated, however, the titanium dioxide is said to cement them into a dry, highly heat resistant finish which has worked well as a protective coating. Exposure tests of a paint system consisting of two coats of butyl titanate-zinc dust followed by two coats of butyl titanate-aluminum paint is claimed to have been successful on smokestacks and exhaust pipes. Trials are now underway to determine the resistance of these coatings to sea water.

Reactivate Bone Char With Superheated Steam

Spent bone char has been reactivated with superheated steam on an experimental scale, according to a recent report. The superheated steam is said to act as an oxidizing agent, removing organic impurities. It also hydrolyzes the calcium sulfide present in the char, which results in progressive removal of this undesirable compound. Char reactivated with superheated steam in this method is described as comparing favorably with that prepared by standard treatment. There is reportedly no significant cumulative change in the chemical or physical properties of the reactivated char except for a slight loss of carbon and a small apparent increase in absorptive capacity.

August 25 ★ **U.S.I. CHEMICAL NEWS** ★ 1951

CONTINUED

Methionine in Feeds

formulations, feed grade methionine will play an increasingly more important role in producing high quality feed that will give satisfactory gains at low cost. U.S.I. is a major producer of feed grade methionine.

CONTINUED

Grain Protectant

stored nearby. A check made on May 25, 1951 showed heavy infestation of Angoumois grain moth in the untreated corn, while the treated corn was completely free of insects. Similar results were obtained in tests on oats, barley, rough rice and brewers rice in different parts of the country where severe insect problems exist.

"Quart Jar Test"

Southern farmers, agricultural leaders, and

Regulatory officials concerned with foods and feeds recognize Pyrenone Grain Protectant as non-toxic to warm-blooded animals. Cattle have been fed corn treated with 4 times the normal amount of Pyrenone Grain Protectant with no noticeable effects.

farm dealers are being given an opportunity to prove to themselves the effectiveness of Pyrenone Grain Protectant on their own corn on their own premises. Special "Quart Jar Test" kits will be distributed to these groups. Announcement of the availability of the test kits will be made through advertising in farm magazines, agricultural leader publications, and a series of dealer-farmer meetings which are to be held throughout the insect-problem area.

'Artificial Muscle' Lifts Over 100 Times Own Weight

An artificial muscle that is capable of doing work has been developed by a university zoologist. The muscle is said to be made up of actomyosin, a chemical material found in all muscles that may cause muscular contraction. The scientist extracted actomyosin from rabbit muscle. The muscle fibers were formed by compressing a film of the actomyosin which had been spread at an air-water interface. When treated with another muscle substance, the artificial muscle is claimed to have lifted over 100 times its own weight.

New Process to Produce Citric Acid at Lower Cost

Much of the citric acid produced commercially is made by fermenting highly purified sugars with *Aspergillus Niger*, the black mold often found on spoiled foods. A new method has been found, involving use of methanol, to induce the mold to make citric acid from such cheaper materials as blackstrap molasses, ground corn, or commercial starch – according to a bacteriologist's report. The methanol is poisonous to the mold, halting its growth and causing it to produce citric acid.

New S.P.I. Procedure For Determining Volatility Of Vinyl Plasticizers

The Society of the Plastics Industry recently released information on its new procedure for determining the loss of plasticizer from vinyl film by volatilization, without the effect of the usual variables such as contamination from the air, insufficient air circulation, and temperature variations within the oven. Procedure involves heating samples with activated carbon in a closed metal can at a temperature of 70°C for 24 hours.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

For quality control calculations, a new desk calculator is said to give results faster than an automatic computer or slide rule. One simple mechanical operation reportedly completes as many as five separate mathematical steps in 2 seconds. Squares, sums of squares, and square roots are claimed to be performed simultaneously. **(No. 709)**

A new vegetable colloid 100% soluble in cold water is described as useful for thickening the water phase of any compound or mixture (synthetic latex for example). **(No. 710)**

Concentrated pigment dispersions in alcohol soluble grades of nitrocellulose are available as the pigment source for high gloss printing inks and other products where toughness of nitrocellulose and dilution with alcohol are needed. **(No. 711)**

"Pasting" metal parts together with a bond stronger than riveting is claimed possible with a new "rubber cement." It has been used for bonding brake linings to brake shoes and assembling gasoline tanks. **(No. 712)**

A new technique measures corrosion as it takes place, permitting faster, easier study of the entire surface area of a sample. Similar to television scanning, it reportedly can be used in studies of corrosion inhibitors, cathodic protection, stress corrosion, etc. **(No. 713)**

A new type of laboratory equipment for measuring pressures as high as 15,000 psi is expected to be valuable in basic studies of high-pressure synthesis. **(No. 714)**

Durable, attractive finishes similar to chromium plating can be produced without the use of copper, nickel, or chromium, it is claimed, by applying a new protective coating over various metal-finishing processes. **(No. 715)**

For fast, accurate determination of gallons-content of 55-gallon drums, a new nomograph is available. It eliminates charts or the need to make long computations. **(No. 716)**

A new rot-proofing agent for wood, textiles, is described as free flowing, powdered copper ammonium fluoride complex, soluble in water. Wood may be sprayed, soaked, brushed, or pressure impregnated; textiles, soaked or padded. **(No. 717)**

A new adhesive for rubber, vinyls, phenolics, textiles, leather, wood, paper, and metals is described as non-tacky, non-reactive, flexible and resistant to water, acids, alkalies, mineral and vegetable oils, and to oxidation and discoloration. **(No. 718)**

SHIPPING . . . . .

CHEMICAL TANK CARS: They're making traffic managers unhappy.

Chlorine in Crates?

Devoted to a discussion of chemical tank cars, a recent meeting in Washington shed light on the acute shortage. But it offered little promise of any relief for the immediate future.

At the meeting, officials of NPA, DPA, ICC and other agencies sat down with chemical traffic managers and representatives of the tank car builders. The dreary picture industry painted can be boiled down to five points:

1. At present there is a fleet of 141,000 tank cars—excluding 8,000 owned and operated by the railroads. The chemical industry is using about 27,000; petroleum industry, 95,000; other industries, 19,000.

2. That fleet would have grown enough to meet demands—if car builders had been able to produce their scheduled 850-900 a month.

3. But the builders haven't been getting enough steel to come close to schedule. Actually, for the first six months of the year, they made 2,041 new tank cars. During the same period, orders totaled 11,129.

4. The result has been a widespread shortage in all types of tank cars, especially in pressure and pressure-insulated types. And it has been aggravated by the scarcity of metal drums.

5. It's going to get worse as new chemical capacity comes in (NPA has 700 applications for expansion in its Chemical Division).

Remedies: NPA suggested several methods to stretch the present supply. One was that it screen new production, determine whether or not cars were on order, and coordinate plant completion date with the car delivery schedule. Industry explained this would not be necessary since it's a standard practice among chemical companies to order cars when expansions are planned.

NPA then brought up the subject of eliminating cross-hauls. The consensus was that a voluntary arrangement might have some merit. It would not be the whole answer though; a similar agreement in World War II had not been too successful.

The simplest solution is the one car builders have advocated since the start of the emergency. They have the capacity, are eager to turn out the needed 850 a month. All they need is an assured supply of steel.

The latest word from NPA on the proposal is that planned allotments of steel will permit the construction of 2,500 tank cars in the first quarter of next year. Meanwhile the outlook for the next few months is not encouraging.

Authoritative estimates place production in July, slightly under 700; in August, 800; in September, 850. Then in October the July failure to allocate steel will be felt, production will slump to 700. This means builders will have to lay off part of their labor force and start the uphill climb to reach capacity all over again.

So the prospects are that the lot of the traffic manager will be an unhappy one for some time. One of them, taking a look at the future, said, "We can't get drums, we can't get tank cars, and we can't ship chlorine in orange crates."

Light On Photosynthesis

For the first time, a natural photosynthetic process has been duplicated in the laboratory.

Researchers of the University of California have succeeded in using light energy and enzymes to fix carbon dioxide in vitro.

Room number 3051 of the University of California's Life Sciences Building was recently the scene of an unprecedented scientific advance. Its occupant, Professor Daniel I. Arnon, has solved one phase of nature's baffling mystery—the process of photosynthesis. Plant physiologist Arnon and associates have reproduced a significant portion of the photosynthetic process in the test tube.

Photosynthesis—plant utilization of solar energy to convert water and carbon dioxide into carbohydrates—involves two basic chemical operations: photolysis of water and reductive fixation of carbon dioxide. Light (and probably chlorophyll) is essential to the first step; the second is catalyzed by enzymes, will occur in the dark. Arnon's group duplicated the latter.

A bicarbonate solution of pyruvic acid, chloroplast fragments, malic enzyme, coenzyme II, and a trace of manganese ion was exposed to light. Using isotopic carbon dioxide, the researchers discovered that the pyruvic acid was converted to malic acid and oxygen was evolved. This is essentially the job done by plants.

Briefly, the photosynthetic process works somewhat like this: Chlorophyll decomposes water in the presence of light to hydrogen and oxygen. Carbon dioxide is fixed by reacting with keto acids such as pyruvic and later reduced to carbohydrate by the hydrogen released from water. Arnon accomplished the fixation in the laboratory, winding up with malic acid—the reduced reaction product of pyruvic and carbon dioxide.

In effect, the researchers duplicated the components of the photosynthetic setup. All their ingredients are normally found in green plants. Pyruvates, fundamental carbohydrate building blocks, are abundant in nature. Chloroplasts are sub-cellular chlorophyll-containing structures. Malic enzyme is a natural agent—specific towards pyruvic acid, coenzyme II (triphosphopyridine nucleotide), and l-malic acid—for the reductive fixation of carbon dioxide. It appears in the cytoplasmic fluid of green plants, but recently was isolated from animal livers.

The manganese used in the experiment acted as a catalyst. This too, is in keeping with the natural process. For years physiologists have been aware that soil concentrations of manganese as low as one part per million are critical to the maintenance of plant life. Now they know why.

Temperature control proved vital to the success of the experiment; 15 C and 20 C are the critical limits. The bicarbonate solution was used to supply carbon dioxide. A small amount of salt was needed in the laboratory studies, although it appears to be unnecessary for the process in the living plant.

Arnon's work does much to settle the question of whether it's possible to reproduce a complex physiological process outside the delicate environment of the living cell. He intends to use his data for further investigation of the plant's life-sustaining functions: the conversion of the sun's rays to chemical energy and the production of food.

In his own words: "I am not out to displace the sugar beet or the sugar industry. A long and arduous path lies between this first primitive extracellular photosynthetic process and extracellular synthesis of our food supply—if indeed it is either possible in the first place or desirable in the second."

Soda Straws To Pipettes

D. D. TUNNICLIFF of Shell Development Company rings the bell this week with a new idea in pipette holders. Patterned after the common drinking straw dispenser, the device is easy to handle, keeps pipettes clean and protected. Laboratory supervisors searching for ways to cut down glassware breakage should take a real shine to the new gadget.

Electrons For Polymers

Cathode rays are high on the list of new polymerizing agents. That's the word from General Electric's researchers John V. Schmitz and Elliott J. Lawton. In studies conducted at the GE laboratories, it was found that cathode rays can effectively convert liquid monomers to solid plastics.

According to the GE scientists, a beam of electrons at 800,000 volts acts as an atomic rearranger. High-speed electrons collide with several atoms and displace a few of the orbital electrons or become attached to the atoms themselves. The small atomic alteration thus produced starts the reaction which then proceeds through the volume of liquid exposed to the electron beam.

Industry Spurs Hot Atom Surge

Radioisotopes have had a record year in industrial research. Shipments of leading isotopes were way over previous highs. Reason: A striking growth of interest coupled with efficient private management of government facilities.

All told, the Atomic Energy Commission has made 20,450 isotope shipments to more than 600 private organizations in this country over the past five years.

Radiocobalt leads the field,* but iodine and phosphorus are coming fast. AEC has shipped 564% more radioactive cobalt during the past year than the previous four years combined. Isotopic iodine and phosphorus showed increases of 94 and 54% respectively. Soon several newcomers may be making records of their own; AEC has recently boosted the list of available hot atoms from 26 to 99.

New industrial applications account, in large measure, for the rising success of the hot atom project. Among them: a method developed by the Rock Island Arsenal for determining the concentration of sulfur in chrome plating baths; a technique for measuring tire wear devised by the B. F. Goodrich Research Center; a method of measuring the self-diffusion of cobalt, pioneered at the Carnegie Institute of Technology; and a procedure for forecasting the deterioration of asphalt roads, developed at the laboratories of the Atlantic Refining Co.

But the AEC isn't waiting for lightning to strike. It's taking an active hand in assisting research organizations with their special atomic projects. A good deal of potentially valuable work gets the benefit of AEC materials and services.

Bugs to Polymers: Columbia University is using radioactive by-products in its efforts to come up with new methods of food preservation. Researchers at Massachusetts Institute of Technology are studying the amount of atomic bombardment needed to kill bacteria and other food-contaminating agents. Chemists of Yale University are exploring the effects of intease gamma radiation on gas-phase reactions and a University of Michigan group is engaged in a broad study of the influence of radiation on chemical and physical reactions.

Scientists at the Brookhaven National Laboratory have already harnessed radiation from a cobalt source to induce polymerization without the benefit of heat, pressure, or catalysts.

The AEC gives the lion's share of credit for its isotopes program to the Oak Ridge National Laboratory, operated by the Carbide and Carbon Chemicals Division of Union Carbide and Carbon Corp. An interesting sidelight to the isotope story is that private enterprise is becoming more interested in the producing end of the business. Bendix Aviation Corp. and Tracerlab, Inc., have already proposed that the AEC investigate the feasibility of privately owned large-scale radioisotope production and processing facilities. Studies along this line are expected to get under way shortly.

New Phthalic Source

Phenanthrene as a raw material for the manufacture of phthalic anhydride is the possibility opened up by the laboratory studies now being completed by the British Coal Utilization Research Association.

An actual yield of 55% of the theoretical has been obtained by the new process which consists of the catalyzed oxidation of phenanthrene. Sodium-vanadium pentoxide microspheres are the catalyst for the reaction which is carried out in a fluidized bed, 1-2″ in diameter in the experimental unit.

The new process may be the dawn of a useful future for phenanthrene, a major constituent of anthracene cake, formed in the fractionation of coal tar. At present there are only minor uses for the material which with carbazole and anthracene comprises the cake. This lack of uses for phenanthrene has been an obstacle to its commercial exploitation.

Another Help: Developers of the new process also point out that the anthracene content of the cake could be utilized for the manufacture of anthraquinone which is currently made by the condensation of phthalic anhydride with benzene. Thus, directly and indirectly, anthracene cake may be made to provide some future help in times of phthalic anhydride shortage.

•

Ionic Probe: Bersworth Laboratories (Framingham, Mass.) is supporting a research group at Clark University working towards the development of new reagents for deactivating metal ions. Reactions of metals with amino acids are coming in for a major share of attention.

•

Easy Recovery: Production of acetaldehyde by the dehydrogenation of ethyl alcohol offers definite advantages over more conventional processes. Researchers at Columbia University, using a copper-chromium-cobalt catlyst, have come up with a method which gives high yields. Acetaldehyde recovery is relatively simple; high-purity hydrogen is obtained as a by-product.

•

Cellulose and Lignin: Montreal will be the scene for the International Symposium on the Fundamental Chemistry of Cellulose and Lignin to be held September 24-26. Organized by the Pulp and Paper Research Institute of Canada, the meeting will hear prominent workers representing 13 nations.

•

Sweet Resin: Commercially available for the first time, Valite Resin 1366-M is now being offered by the Valite Corp. (New Orleans, La.).

An acid-catalyzed, semi-thermosetting product of phenol and bagasse (sugar cane cellulose), the material is completely soluble in alcohol, acetone and common organic solvents. A dark brown to black solid, Valite Resin 1366-M is compatible with conventional phenol-formaldehyde resins and converts to a fast curing thermoset by the addition of alkalis (i.e. calcium hydroxide) and aldehydes.

A valuable feature of the product is that it can be dissolved in aqueous alkali, reacted with formaldehyde and put into alcohol solution to produce an impregnating resin varnish. Extender resin in molding compounds is another interesting application.

•

New Dosimeter: Researchers at the University of California's Los Angeles School of Medicine have put in almost three years of work on the development of radiation dosimeters. One new type—the chloroform-dye dosimeter—makes use of the ability of gamma radiation to produce hydrochloric acid from chloroform. The acid then changes the color of an indicator dye from purple to yellow.

•

Fungi Beware: Radioactive isotopes are aiding a study of fungicidal activity at Battelle Memorial Institute. Used in tracer studies, the hot atoms are paving the way for a more logical approach to better fungicides.

* Some 72 industrial companies are now using isotopic cobalt for radiography.

SEVEN SOLUTIONS

TO THE

Sulfur Shortage

Since sulfuric acid is vital to almost every industry, the current shortage of elemental sulfur, from which this acid is generally derived, is a serious matter and has a world-wide effect. Waste materials that can be converted into sulfuric acid and unworked sulfur bearing ores hold the answer to the sulfur shortage. Chemico offers proven processes for utilizing such sources of sulfur. If you have a source, in commercial quantities, of any of the following materials, please give us details. We will then be glad to make specific recommendations without obligation.

WASTE MATERIALS

1. Spent Alkylation Acid, a refinery by-product in the manufacture of high octane gasoline, can be regenerated into fresh sulfuric acid of any desired strength.

2. Oil Refinery Sludge is another refinery by-product resulting from the treatment of petroleum fractions. The acid content is recovered as fresh acid of high strength.

3. Waste Iron Sulfate-Acid Solutions are by-products from steel mills and titanium pigment manufacturing plants. The sulfuric acid is concentrated for re-use and the iron sulfate converted to fresh sulfuric acid.

4. Smelter Gas results from metallurgical operations where sulfide ores are roasted preliminary to the recovery of metals. The gas is cleaned and processed into fresh sulfuric acid.

5. Coke Oven, Natural and Refinery Gases contain sulfur as hydrogen sulfide. This may be reduced to sulfur or extracted directly as a raw material for producing sulfuric acid.

SULFUR BEARING ORES

6. Pyrites and other metal sulfides are roasted to produce sulfur dioxide gas which is then converted into sulfuric acid.

7. Low-grade Surface Deposits containing sulfur in elemental form are treated by a new and economically sound process which recovers the high quality sulfur necessary for modern contact plant operation.

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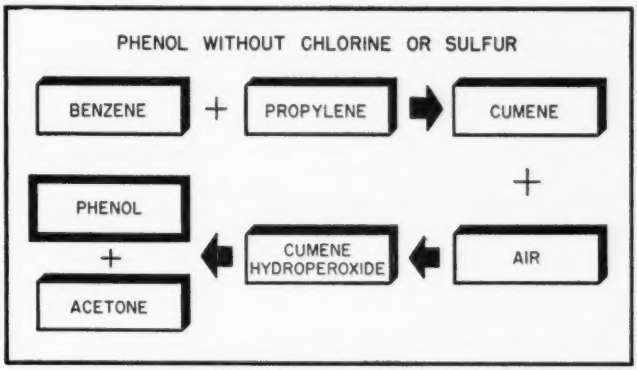

Now, Phenol from Cumene

New process to make phenol from cumene and air will be used in two phenol plants to be built during coming year.

Elimination of sulfonation or chlorination steps makes method attractive in view of sulfur and chlorine squeeze.

Acetone, by-product of new process, also enhances its use picture.

Something new has been added to the phenol industry—specifically, it's a totally different way of manufacturing this much needed chemical staple. It starts with benzene as do all the other processes now in use. But at this point the similarity ends. For the new method, instead of forming phenol via a sulfonation or chlorination, does it by first making cumene (isopropyl benzene) from the benzene, oxidizing the cumene to cumene hydroperoxide, which upon treatment with acid disproportionates into acetone and phenol.

The new process* is a product of two wartime research achievements: (1) development of a practical process for the manufacture of cumene for use as an aviation fuel additive; (2) development of the redox system for the catalysis of the polymerization of butadiene and styrene to make synthetic rubber by a cumene hydroperoxide catalyst.

To Be Used: New process proposals are a dime a dozen. But the cumene method definitely does not fall into this category. As proof, it will be used in two new plants soon to be erected: one in the United States by Barrett and another in Canada by the British-American-Shawinigan combine. Added interest is generated in the process by the fact that simultaneously with the production of phenol, it also produces acetone, an important product at almost anytime and place.

Old Methods: The big difficulty with the older methods for producing phenol are that they require sulfur and chlorine, two hard-to-get chemicals in these shortage-ridden times. One of the currently used processes seeks to circumvent this difficulty by employing regenerative chlorination . . . which does not entail a major consumption of chlorine. In this method benzene is first chlorinated by reaction with a mixture of hydrochloric acid and air. Phenol is formed by a vapor phase hydrolysis of the chlorobenzene with steam and the hydrochloric acid is regenerated for further use.

New Method: The new method, of course, though it does not require either sulfur or chlorine, does demand benzene as the starting material. The present benzene shortage, however, should not threaten its future. By the time the new phenol plants will be coming on stream, the worst of the benzene drought promises to be over.

Estimates also show that the cumene method will produce the same poundage of phenol per pound of benzene as the three major processes now in use. This fact should add a little sweetness to the otherwise dismal picture that increased benzene prices have painted.

Simple Operation: In the new process, cumene is oxidized in the liquid phase with air to form the hydroperoxide. For best results the reaction is stopped when about 35-50% complete. It can be carried out either in an inert solvent or in an emulsion (emulsifiers: sodium stearate, sodium ricinoleate or sodium lauryl sulfate).

Decomposition of the hydroperoxide is facilitated by boiling at increased pressure. And acids used to catalyze the decomposition include sulfuric, phosphoric, acetic, paratoluene sulfonic or a hydrogen ion exchanger. A high acid concentration provides a high rate of decomposition. Acetone passes off as vapor during the decomposition.

Distillation Figures: Upon completion of the reaction, the cumene and the newly formed phenol are removed by distillation. Some phenol must be extracted from the cumene fraction with aqueous alkali because it has a bad effect on the formation of the per-compound from the recycled hydrocarbon. Another contaminant, alpha-methyl styrene, is removed by the use of mild hydrogenation, sulfuric acid or alkaline permanganate solution. The phenol contaminant, acetophenone, is taken out by further distillation.

Other Products: The same hydroperoxidation can also be obtained when using diisopropyl benzene instead of cumene . . . but the use of various decomposition agents gives different products. For instance, the monohydroperoxide is converted into isopropyl phenol by heating with a mineral acid; into isopropyl acetophenone by heating with aqueous ferrous sulfate; into diisopropyl benzene monocarbinol by heating with sodium sulfite.

Diisopropyl benzene hydroperoxide forms hydroquinone upon heating with mineral acid; diacetyl benzene with aqueous ferrous sulfate; bis (2-hydroxy propyl-2) benzene with sodium sulfite; and bis (alpha-methyl vinyl benzene) by heating with alkali bisulfate.

New Era: Experts believe that the new method for synthesizing phenol is only a starter. The real significance of the new development lies in the fact that it represents a bright new way of attaching substituents on the aromatic ring without benefit of chlorination or sulfonation. And in

* BP 626,095; 629,429; 630,286; and 641,250.

days of chlorine and sulfur shortages, that's a noteworthy accomplishment.

Sulfur Separator

With the sulfur shortage apparently destined to continue until 1953 (CW, Aug. 18) a promising sulfur recovery process always evokes interest. News: A new catalytic method for recovery from gases is now under investigation by Ferralyst Desulphurizing Corp., New York. Three patents (USP 2,559,323-5) have been issued on the process and others are pending.

The Ferralyst process originated in Australia and has been in the research stage for several years. However, contrary to published foreign reports, there is no commercial plant under construction in the United States at the present time. But according to the company a large scale pilot plant is already under construction.

Ferralyst hopes that the recovered product will be able to compete with sulfur produced at current levels in any part of the United States when the process is used on a gas containing above 2% total sulfur and in smaller units than the presently-used modified Claus process.

In operation all organic and inorganic compounds of sulfur in the gas are oxidized to elemental sulfur or sulfur dioxide in a single pass over the catalyst which is a mixture of active iron sulfides, sodium sulfide and sodium sulfite. It is used as ¼-½" irregular granules, either directly or deposited on a catalyst carrier such as kieselguhr.

One of the catalyst's chief merits is that it does not chemically foul except in the presence of relatively large quantities of cyanogen or at cracking temperatures when carbon will deposit. However, the catalyst can foul mechanically through tar, oil fog or dust. But in normal circumstances it needs no regeneration.

Performance: Performance of the process is good over a wide variety of conditions. With hydrocarbon gases the process temperature range is 110-240 C for elemental sulfur and between 110 and 400 C for sulfur dioxide production. Operating pressure is from 1-20 atmospheres, and the space velocity may vary over a wide range.

The catalyst has little effect on the constituents of the gases or vapors, but has a selective action on all such sulfides as hydrogen sulfide, mercaptans, dimethyl sulfide, thiophene, carbonyl sulfide, carbon disulfide, etc.

By varying the pre-treatment of the catalyst the process can be operated in three different ways: (1) to absorb the sulfides in the gas, where the catalyst is eventually fouled; (2) to convert totally to sulfur dioxide which can be scrubbed out in a standard caustic wash; (3) to convert partially to elemental sulfur, in which case the product is best recovered by scrubbing with liquid sulfur. No sulfur deposits on the catalyst.

Development: Developed originally during wartime investigations of the Australian Government into the synthesis of liquid and gaseous hydrocarbons from industrially produced water gas, the process has undergone pilot plant tests in Australia.

Sulfur-hungry industry will keep a sharp eye on the process. Successful operation could mean quicker sulfur relief.

Chlorine Analyzer

To eliminate the errors created by spot checks of the chlorine concentration in process gases, J. F. Arbogast and R. H. Osborn of Hercules Powder Co. have developed an instrument to continuously record the quantity of chlorine contained in a flowing gas stream.

The new device consists essentially of a photoelectric potentiometer whose output feeds into a recorder which reads directly in per cent of chlorine. The gas-handling system is such that the sample gas is maintained at constant temperature and pressure in the optical absorption cell of the photometer.

Use of the instrument is not limited to determination of chlorine concentration. It will operate satisfactorily on such gases as nitrogen dioxide and it can also be modified to handle liquids and provide continuous colorimetric determinations.

•

Waste Disposal: Use of sewage outfalls into deep water for waste disposal is continuing to increase in Western Washington. Pulp mills at Camas and Everett have built such pipelines to carry off the waste liquor, harmful to marine life if discharged near the shore. Latest to join the parade is the Longview Fibre Co. which will extend the present 965-foot line by 600 feet at its pulp plant on the Columbia River.

•

Filter Factory: Eimco Corp. has placed a new $500,000 plant for manufacture of filters into operation in Salt Lake City. Full production is expected by fall when it will add 100 employees to its present 50.

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As we listen to the latest insults from Moscow, we're likely to get fighting mad.

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It is clear by now that Stalin and his gang respect just one thing—strength. Behind the Iron Curtain they've been building a huge fighting machine while we were reducing ours. Now we must rebuild our defenses—*fast.*

As things stand today, there is just *one* way to prevent World War III. That is to re-arm—to become strong—and to stay that way!

This calls for better productivity all along the line. Not just in making guns, tanks and planes, but in turning out civilian goods, too.

Arms must come first. But we must produce arms *at the same time* we produce civilian goods.

We can do this double job if we all work together to turn out more for every hour we work—if we use our ingenuity to step up productivity.

All of us must now make sacrifices for the common good. But we're working for the biggest reward of all —*peace with freedom!*

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SPECIALTIES . . . . . .

Switch to Latex-Base

Pittsburgh Plate Glass is the latest of big paint makers to come out with a butadiene-styrene latex-base paint, joining Glidden, Sherwin-Williams and a growing list of smaller manufacturers.

Sales are skyrocketing as consumers go for the easy application and quick drying features, the durability and washability of the finish. And professional painters are overcoming early resistance to the new emulsion paints.

The emulsion paint "revolution" that began back in late 1948 when Glidden introduced its Spred Satin is not over yet. Another big paint maker—Pittsburgh Plate Glass—has recently moved into the field, and the number of smaller companies making latex-based paints is growing.

Among other companies now offering such products are W. P. Fuller, Wesco Waterpaints, National Chemical Mfg., Benjamin Moore, Muralo and, of course, Sherwin-Williams.

Spred Satin and Super Kem-Tone, Sherwin-Williams' product that was born early in 1950, are the sales leaders among the new paints. Although neither Glidden nor S-W will mention sales figures, it is not difficult to deduce that they have nothing to be ashamed of. Glidden currently is straining to keep up with demand, has four of its nine plants turning out SS, plans to convert more plants soon and is just breaking a big fall promotion campaign. S-W's 50,000 dealers are clamoring for more Super Kem-Tone, and the company, now making the product in Chicago, Oakland, Cleveland and Newark, also plans to convert more of its nine plants to the latex emulsions.

Home Painters: Consumers have gone for the new emulsion paints because they are easy to apply with brush or roller, cover well and even an amateur can do a good job. Brush marks don't show, and missed spots can be filled in without showing. They dry in about 20 minutes, doing away with the general household upheaval common to painting with conventional drying oil types. Being water-based, they don't have the traditional paint odor, spills are easily wiped up, and brushes can be readily rinsed. The dry film is very durable and resistant to common stains; and the rubbery surface can be washed repeatedly.

Professional painters have offered some resistance to the new paints, but increasing numbers are beginning to realize that: (a) They get a lot more jobs done in a lot less time; (b) They have many more satisfied customers because of the durability and washability of the finish; (c) National promotions of companies like Glidden and S-W are stimulating prospective customers into wanting a paint job they're too lazy, or unable, to do themselves; (d) Second coats, where needed, can be started within a half hour of finishing the first one; (e) No primers are needed; (f) Being able to clean brushes, buckets and spills with soap and water is an advantage to them as well as the amateur.

These latex emulsions are upsetting traditions in the pattern of paint sales as well as in the attitudes of painters and home decorators. Normally the paint business is seasonal—sales boom in the spring and fall when women conduct their big cleaning campaigns and change furniture, screens, etc. For some not clearly defined reason, latex-based paints have not exhibited these seasonal declines and rises. Part of it may be their newness—sales are continually growing and they are reaching new customers even in the off seasons. More of it, paint men hope, may be their ease of use.

Uplifting Influence: Not only have companies with latex emulsion paints enjoyed profits from their sales, but they attribute to the new products a salutary effect on their whole lines. Glidden, for example, points to a total sales increase of about one-third across the board, feels it owes it all to Spred Satin which brought in dealers to the Glidden line for the first time, and consumers too. Also the householder spurred into giving his walls a latex finish, buys other paints.

Another desirable feature is that the sales gap between slow- and fast-moving items is much less than in regular paint. The "normal" 50% for fast and 6% for slow movers is unheard of in latex-based numbers. Apparently more people like all of a line.

Spred Satin, originally available in 12 colors, all pastels, now boasts—with subtractions and additions since then—15 colors, about a third of which are deep colors. The advent of these

LATEX PAINTS: Only difference between amateurs and pros is the pay.

so-called "decorator" colors represents new discoveries in color formulations and was made possible by the latex-emulsion's happy ability to give outstanding uniformity to a finish. And it is fortunate, too, that deep colors are so popular, for they take less titanium pigment and more paint can be produced from a titanium allotment.

Super Kem-Tone is available in 12 colors, four of which are deep colors, and white. Wallhide Rubberized Satin Finish, as PPG's new product is called, is being marketed in 12 solid colors plus white.

Styrene-Butadiene: Most of the new "rubber" paints being sold are based on styrene-butadiene latices, although some are plasticized styrene. These are supplied by chemical producers* to paint manufacturers who add protective colloids, preservatives, mildew inhibitors, and white, colored and inert pigments to form the finished product.

Currently latex-emulsion paints are being recommended only for interior work, but companies are devising formulations that won't chalk on exteriors. Interiors alone, however, are no small market, representing one-fourth of the billion dollars spent yearly for all paint.

According to one estimate, over 50% of the interior paint sales of major companies producing the new paints may be latex-based. Few think they will stop with merely expanding in that area. Some enthusiasts even think they will take over the entire paint field some day.

* Producers of either high styrene-butadiene or plasticized styrene latices include American Polymer, Dewey and Almy, Dow, Monsanto and Naugatuck Chemical.

Crabgrass Massacre Means Dollars

Potent crabgrass killers, potassium cyanate and phenyl mercuric acetate, are cornering expanding market.

New competitors from the experimental stations pose future challenge to this "big two".

This year's battle against lawn gardeners' public enemy No. 1, crabgrass, is in full swing. On front lawns, and in parks and golf courses, "embattled grass farmers" are watching results of new chemical crabgrass killers. And at agricultural stations scientists are busily developing new members of the anti-crabgrass arsenal.

Intensely interested observers of the battle are producers of the chemical products for this fast-growing specialty field. Reason: an estimated market of 20 million homeowners with lawns plagued by crabgrass.

Latest reports from the experimental front show a group of boronium fluorides and dichloral urea as most promising newcomers. At the moment the boronium fluorides, under test at Rutgers*, look like the best bet for future commercial use.

In the Thick of It: While keeping one eye on the new chemicals, commercial producers are concentrating on either PC (potassium cyanate) or PMA (phenyl mercuric acetate), present "big two" of crabgrass control.

Prior to their appearance, chemical crabgrass control was a job for arsenites. Highly toxic, hard to handle, and non-selective, arsenites are impractical for home use. What was needed was an effective, non-toxic, selective, and easily handled herbicide for crabgrass.

Extensive experiments conducted over the last five years by American Cyanamid, largest producer of PC, and by O. M. Scott and Sons, sellers of Scutl, a PMA material, indicated that both filled the bill better than any others then known.

Take Your Pick: Both PC and PMA do the job. To get the end result—dead crabgrass—both are potent materials. Differences are largely a matter of economics, convenience, speed, and side effects.

PC is manufactuerd primarily by American Cyanamid, and sold at $1 a 4- or 5-oz can, under trade names, by some 11 herbicide producers including: American Chemical Paint Co. (Weedone), Associated Chemists Inc. (Weedanol Cyanol), Nott Manufacturing Co. (Crab-Not Crabgrass Killer), and Garden Products Co. (P.C. 80).

POTASSIUM CYANATE: Before and after.

A dry, white powder, PC is mixed with water and sprayed from a hand sprayer. To gain greater coverage a wetting agent is usually incorporated into the formula. PC will also kill chickweed, purslane, knotweed, speedwell, groundivy, and crowfoot.

PC works very fast—the weed dies in hours—and is effective against the mature weed. In fact it is recommended for late-season use just before the weed goes to seed. Rain is not a factor since its killing action is over in only a few hours. Coupled with its cheapness—the $1 can will cover 1200 sq. ft. of lawn—and the fewer repeat applications necessary, these are the selling points of PC.

PMA is produced by many companies, among which are F. W. Berk, Consolidated Midland, and Metalsalts, and is sold to herbicide manufacturers for formulation and distribution.

It comes both as powder and in solution. While the wet is perhaps slightly more effective, the dry is more convenient and popular. PMA tends to be much slower-acting than PC, requires more applications, and is relatively ineffective against the mature plant. On the other hand it will kill over a longer time range.

Also, PMA is less harmful to good grasses, especially fine grasses such as bent grass. While PC will give only temporary browning under normal conditions, in hot, dry weather damage can be considerable. The browned grass is usually removed at the first mowing, but to many homeowners, any browning is undesirable.

A popular dry PMA formulation is Scott's Scutl. Selling at $1.95 for a 5-pound box that will cover about the same area as the $1 can of PC, it is considerably more expensive. It is claimed to be completely selective, killing only crabgrass.

Selling points are its greater ease of handling—no mixing or sprayer involved—less harmful effect on desirable grasses, inconspicuous green color, and effectiveness over a longer period of time.

Although the companies are leery of giving out figures, the market is large and definitely growing. Last year Cyanamid sold 150,000 lbs. of PC to herbicide producers, and a marked increase was noted this year. Scutl has been one of the biggest specialty successes of the season.

Formulations vary considerably. PC killers can range up to 80% PC, and most contain this amount, while PMA formulas go from the ¾% in Scutl to over 10% in other formulas. Actually the formula makes little difference. It is the PC or PMA that does the work, and most formulas, if applied according to instructions, will give the same concentration per unit area, which is the important thing.

Coming-Up: Both new compounds, dichloral urea and the boronium fluorides, are seen by weed control experts as future commercial competitors for the big two. Both are easy to handle, non-toxic to humans, highly selective, and, in most tests so far, have shown less harmful effect on good grasses.

Dichloral urea is less advanced in testing than the boroniums, but enough has been seen to make it a strong bidder for commercial use. Unlike the present compounds, it is not a contact killer but works on the subsoil seeds and shoots. While it is claimed to be easy to handle, it apparently requires much more expert work, and rather narrow and rigid conditions of use, to be effective. Seemingly it only works just before the shoots come up.

The boronium fluorides, on the other hand, have the weed men at Rutgers highly enthused. Also contact killers, they are sprayed, and seem

* Agricultural Experiment Stations at Rutgers, Purdue and Cornell are doing extensive work on crabgrass control.

most effective in early July. They are cheap, work faster than PMA, and leave other grasses in excellent condition. At present the only producer appears to be Frank Sowa in New York who has been turning out small quantities for some 4 years. Although the best on the horizon at the moment, they are by no means ready for wide use, since results have tended to vary considerably.

Potential: While a well-kept and cared-for lawn is still basic to crabgrass control, chemical killers are here to stay. Crabgrass is tough, durable, and grows everywhere. After years of weeding, pouring salt, old motor oil, and other poisons on their lawns, homeowners are an anxious market for herbicides. With such a bright potential, crabgrass killer producers, while boosting output of PC and PMA, are beating the bushes for even better compounds.

Foot Balm Bomb

New athlete's foot remedy, packaged in an aerosol container as No-If Spray Mist, is being test-marketed in Philadelphia.

The product is both a preventive and treatment for athlete's foot; it is also recommended for relief of tired, sore and burning feet, and as an antiodorant. Active ingredients are undecylenic acid, dihydroxydichlordiphenylmethane, trimethyl cyclohexanol, salicylic acid and camphor. It is packaged in a 4-oz. aerosol container which dispenses the material as a fine mist.

No-If Spray Mist is the product of the comparatively new Pure Drug and Chemical Corp., a subsidiary of United Dye & Chemical Corp., which has offices in New York City and a plant in Chester, Pa. It was developed by James Mugford, a chemist who is vice president and general manager of the new company.

The turquoise-, blue-, pink- and white-labelled cans retail at $1.89 in drug, shoe and department stores. If used judiciously, one can is supposed to last for at least a year.

Distribution will be through drug wholesalers following the current six-week test campaign in Philadelphia in drug stores and through local television and radio promotion. To date reception of the product has been very good, the company reports, and in September, additional markets will be added in a national expansion.

Pure Drug and Chemical is also preparing to market in late fall a small home-type fire extinguisher in the same 4-oz. aerosol bomb, using basic fire extinguisher fluids.

O.K. for P&G: The National Production Authority has given the go ahead signal for the construction of a Procter & Gamble plant to make soap, soap powders and allied products near Sacramento, Calif. NPA approval calls for an initial 12 buildings with an aggregate of 211,130 sq. ft. to be built at an estimated cost of $2,685,980. The company hopes to have first units in operation in 1953, plans a $25 million investment at the Sacramento location.

•

Continuous Detergents: Principal products of the $2.5 million plant that General Aniline & Film will build at Doe Run, Ky. (on the Ohio River about 25 miles from Louisville) will be non-ionic detergents. These will be manufactured by a continuous process that has been under development at the company's Grasselli, N.J., plant for some time.

GAF has bought 100 acres next to Mathieson Hydrocarbon Chemical's new $25 million plant, from which it will procure the necessary raw materials. Until the plant comes in (about 18 months hence), these will be shipped to Grasselli for processing.

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Insecticide Plant: California Spray-Chemical Corp., producer of insecticides, fungicides and weed killers, has opened a plant at Decatur, Ala.

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Rug Gripper: No-Slip is the trade name of a new rug anti-slip product that has just been test marketed in St. Louis and Des Moines department stores and by mail order, and is now to be nationally distributed by its manufacturer, No-Slip Co. (Des Moines, Ia.). A fluffy white powder, it is sprinkled on the underside of any type of rug or fabric and rubbed in lightly. When turned back, rugs seem to be glued to the floor, yet are not sticky or gummy.

The product, which is also recommended for use on desk blotters, telephone pads or any place where fabric contacts a slick surface, comes in a carton with punch-out, shaker holes. It is said to contain a year's supply (reuse necessary only after washing or cleaning), retails at $1.

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Plant Site: Land and buildings comprising the Booster No. 2 line of the old Arkansas Ordnance Plant at Jacksonville, Ark., have been purchased by Agricultural Chemicals, Inc., Llano, Tex., from the Redmond Co., which obtained it from the Government as surplus property several years ago. The Texas firm, an insecticide manufacturer, has not yet revealed its plans for the plant.

BOOKS.....

Filed Data

The chemical processing field now has a new source to draw upon for answering its constant need for necessary technical information—thanks to Tom Dillingham and his brain-child, Chem-File, Inc. Dillingham, formerly with the Catalog Division of Reinhold Publishing Corporation has opened offices in New York City.

As the name implies, the new venture consists of technical services which supply chemical data, filed for reference in a single unit. All available information, such as properties, availability, derivation, specifications, uses, prices, patents, bibliographical references, etc., are compiled and printed on 5" x 8" cards. These cards are filed alphabetically, along with a cross-index, in steel cabinets. They are rented to laboratories, libraries and research centers.

Briefly Listed

CHEMICAL SPECTROSCOPY, by Wallace R. Brode, a 52-page ASTM Edgar Marburg Lecture discussing the development and use of spectroscopic methods in analytical control and outlining the use of both emission spectra and absorption spectra procedures along with their limitations. Can be procured from American Society for Testing Materials, 1916 Race Street, Philadelphia, Pa., at $1.35 per copy.

MEETINGS..

Amer. Pharm. Assn., Statler Hotel, Buffalo N.Y., August 26-31.

Summer Symposium, Nuclear Energy Development, annual meeting, Oak Ridge, August 27-September 7.

Amer. Chem. Soc., Diamond Jubilee Meeting, New York, N. Y., September 3-7.

Natl. Agric. Chems. Assn., annual meeting, Essex & Sussex Hotel, Spring Lake, N.J., September 5-7.

Amer. Soybean Assn., annual meeting, Fort Des Moines Hotel, Des Moines, Iowa, September 6-8.

Natl. Instr. Conf. & Exhibit, Sam Houston Coliseum, Houston, Texas, September 10-14.

Amer. Inst. of Chem. Engineers, national meeting, Sheraton Hotel, Rochester, N.Y., September 16-19.

PICTURES IN THIS ISSUE:
Cover (top)—World Wide Photos; p. 7—World Wide Photos; p. 8—Deane's Studio.

MONSANTO POLYPHOSPHATE PLANT: More complexes for simpler cleaning.

Bringing Up Poly

Lusty growth of synthetic detergents thrusts polyphosphates into the fore. Latest family addition: potassium tripoly.

Sodium tripoly now biggest and fastest-growing of the phosphates; output this year slated to pass 275 thousand tons.

Phosphorus capacity headed for surge, new and bigger boom due for polyphosphates. But sulfur shortage may hamstring detergent rise this year.

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In a few weeks, a new branch will appear on the tree of chemicals derived from phosphorus. At that time, the Westvaco Chemical Division of Food Machinery and Chemical Corporation should go on stream to make potassium tripolyphosphate at a new plant in Carteret, New Jersey. If the potassium compound catches on as well as the sodium polyphosphates, Westvaco will benefit, and others may make eyes at similar ventures.

Special Duty: Few in the phosphate chemical business figure potassium poly compounds will ever reach the same volume as the various sodium compounds. For one thing, the price of potassium tripoly is estimated to be somewhere around the 20¢ a pound bracket, even with sizable production. The corresponding sodium salt is sold at 7-8¢ a pound. And the potassium compounds do not differ greatly in detergency from the sodium salts.

The chief advantage attributed to the potassium poly is the greater solubility in aqueous and organic solvents. For instance, potassium tripoly is reported to average something like three times the solubility of the corresponding sodium salt. Even more important may be its readier solubility at normal temperatures.

This property should permit the potassium salt to be incorporated in non-ionics, to give a non-separating product with enhanced detergency. General Aniline and Film Corp. is to hold several patents covering the usage of potassium salts of this type for incorporation in its known non-ionics, such as Glim.

Broader Horizons: Because of the price differential, potassium salts will probably move into special applications. These would include uses taking advantage of greater solubility, or where some improvements in properties are realized with small additions. One of the outlets that will undoubtedly be looked at is water softening, where the premium sequestering action of the potassium salt attracts attention. Application in modifying oil well drilling muds is due for consideration, although competition from sodium salts will undoubtedly be keen. In more specialized and higher-valued

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New Advertisements received by August 29th at the New York office, 330 W. 42nd St., N. Y. 18, will appear in the September 8th issue subject to space limitations.

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products, such as medicinals, potassium salts have good potentialities. Other applications in textile scouring and food processing round out most of the prospective uses for the new compound.

No Sodium Slack: This development in the potassium polyphosphates is viewed perhaps more with interest than alarm by producers of the well-established sodium poly salts. For one thing, the price differential indicates that the sodium salts will retain a lion's share of this market. Another reason for their equanimity is that whoever makes the sodium compounds could presumably make the potassium salts as well.

Why Complex: The buying tendency in the past has been to the complex phosphates, and the new potassium salt follows the same trend. Sodium tripoly has made the biggest gains in the phosphate family, and production is running about twice that of its nearest competitor based on phosphate. Output in 1950 came to around 220 thousand tons, and this year will likely exceed 275 thousand tons, mostly going into builders for synthetic detergents.

Supply Outlook: With the tremendous surge in production of phosphorus and phosphoric acid, the eventual outlook for all types of phosphates points to a better supply.

But an acute sulfuric acid shortage looms right now to haunt the hopes of the over-optimistic.

In a Washington meeting this week, NPA indicated that current production rates of synthetic detergents are about 18% over those of 1950 and requirements for the next year could rise another 15%. But, they emphasize, many industries more directly connected with the defense program will get first call on sulfur and sulfuric supplies.

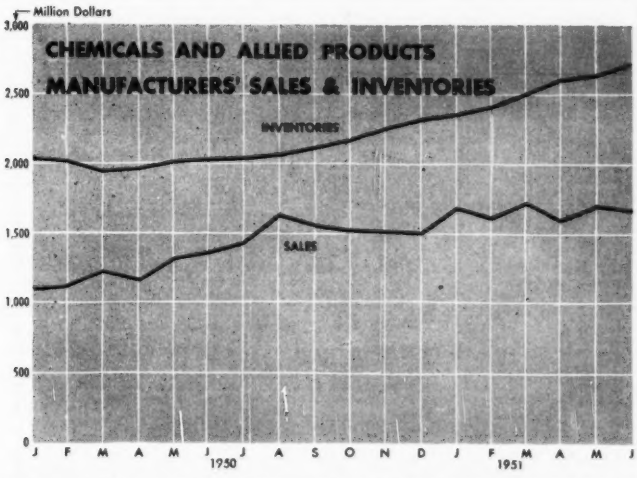
NPA thinks there won't be any particular shortage of sodium phosphate except in the event of all-out war. But in view of the huge, still unsatisfied demand, the supply has a long way to go. In the packaged household detergents business, output has rocketed from 120 million pounds in 1946 to over 900 million pounds last year. Already over 600 million pounds have been sold for the first half of 1951.

Potassium to Share: In this household business, potassium poly will share, but probably will follow the rise of non-ionics. This development will be limited less by sulfuric shortages, since ethylene oxide and phenol are the chief raw materials. With this market and a number of specialized uses, potassium tripoly seems destined to have at least a boomlet to add to the family collection.

Inborne Tally

From now on chemical cargo for the United States will get a lot closer scrutiny than at any time since Korea.

A trio of reasons account for this keener interest by U.S. producers. First, the recently-inked Torquay agreements have lowered tariff barriers



PURCHASING AGENTS this week are facing a dilemma. Their problem: to buy or not. The chemical market has been quiet, and inventories have been rising faster than sales. But defense demands added to the normal fall pickup may induce many to sign more purchase orders.

CHEMICAL MARKETS. . . . . .

on many chemicals, especially those derived from coal-tar. Then, too, European producers are more active now, having not only recovered from the ravages of war, but in many cases surpassing prewar output. And of no less importance, the chemical industry is aware of a supply easing in many chemicals that Korea had forced on the hard-to-get list.

It's Official: This changed market picture sheds added light on the just-released data of the U.S. Tariff Commission on imports during 1950 of coal-tar chemicals, including intermediates and finished chemical products. These figures show an increase in imports even prior to the Torquay pact, and some who felt little concern before can see signs of growing competition.

Coal tar intermediates in 1950 totaled 5.5 million pounds compared with 3.7 million pounds in the preceding year, and 2 million pounds in 1948. Included in the 1950 import were 1.26 million pounds of refined naphthalene and 1.37 million pounds of phthalic anhydride. Other products in this category: 144 thousand pounds of beta-naphthol, 239 thousand pounds of anthraquinone, and 260 thousand pounds of nitrobenzene. Finished chemicals based on coal tar came to 5.7 million pounds compared to 1.4 million pounds in 1949, and 1.6 million pounds for 1948. Dyes, by far the largest single group, were almost double the value of the year before—$4.1 million against $2.2 million.

What Next: In the case of most intermediates, imports amount to less than a few per cent of U.S. production. But among finished chemicals for end-use, such as dyes and pharmaceuticals, the percentage often runs higher. Now it is just in the category of finished chemicals that most of the Torquay concessions have been made, with reductions in many cases of 50%. Manufacturers of products in this classification, where prewar European competition was keenest, will be the first to be concerned about increasing imports, but others are likely to be concerned later.

GOVERNMENT NEEDS

Bid Closing	Invitation No.	Quantity	Item
Commandant of the Marine Corps., Washington, D.C., Attn.: Supply Department Procurement Section:			
September 4	67	65,000 gal	Disinfectant, cresolic, in 5 gal. drums, General Services Admin. Spec. No. 2120
Regional Information Officer, Region 3, General Services Administration, Washington 25, D.C.			
August 27	(5M-2051-R)	9,000 lbs	Putty, white lead-whiting, Type 11, in 5-lb containers
Commanding General, New York Quartermaster Procurement Agency, 111 East 16th Street, New York, N.Y.:			
September 7	52-75B	81,000 lbs	Mildew preventive tablet, volatile, 1 lb package
September 7	52-76B	19,000,000 brs	Soap, ordinary issue
Bureau of Ships, Department of the Navy, Washington 25, D.C.:			
August 30	541-1 QX		Develop and fabricate plastic gear case covers of polyester and melamine resins
Chief, Procurement Division, Supply Service, Veterans Administration, Washington 25, D.C.:			
August 27	A-12	250 drm	Glycerin
August 27	A-12	14,440 lbs	Jelly, lubricating
August 27	A-12	264 btl	Phenol, liquefied
August 27	A-12	11,880 btl	Hydrogen peroxide solution
August 27	A-12	192 btl	Glucose, liquid
August 27	A-12	138 btl	Hydrochloric acid
August 27	A-12	384 btl	Formic acid
August 27	A-12	3,504 btl	Hexavitamin capsules
August 27	A-12	288 btl	Phenobarbital and Belladonna extract tablets
August 27	A-12	2,088 tb	Glyceryl trinitrate tablets 20S
August 27	A-12	864 btl	Glyceryl trinitrate tablets 100S
CO Armed Services, Medical Procurement Agency, 84 Sands Street, Brooklyn 1, New York:			
August 27	69B	7,200 btl	Sodium carbonate, monohydrated, 1 lb NF
August 27	69B	5,064 btl	Sodium dichromate, 1 lb
August 27	69B	2,040 btl	Sodium sulfite, anhydrous
August 27	69B	26,400 cn	Talc, 1 lb. USP
August 27	69B	3,072 lb	Terpin hydrate, 1 lb NF
August 27	76B	14,755 btl	Acetic acid, glacial, 1 lb
August 27	83B	4,144 btl	Agar, 1 lb, USP, powdered
August 27	83B	1,776 btl	Aminophylline, 0.1 gm—(1½ gr) with phenobarbital
August 27	83B	1,536 btl	Ammonium carbonate, ¼ lb USP
August 27	83B	42,048 btl	D-amphetamine sulfate tablets, 5 mg (1/12 gr)
August 27	83B	CC-21,000 pkg	Amyl nitrate ampoules, 0.33
August 27	83B	13,728 btl	Benzyl benzoate, saponated
Oklahoma City Air Materiel Area, Tinker Air Force Base, Oklahoma City, Oklahoma:			
August 27	(IFB)34-601-52-45	576,000 sq. in.	Plastic sheet, transparent, acrylate base, grade 1, .625 x 36 x 48 in., spec. AN-P-44A

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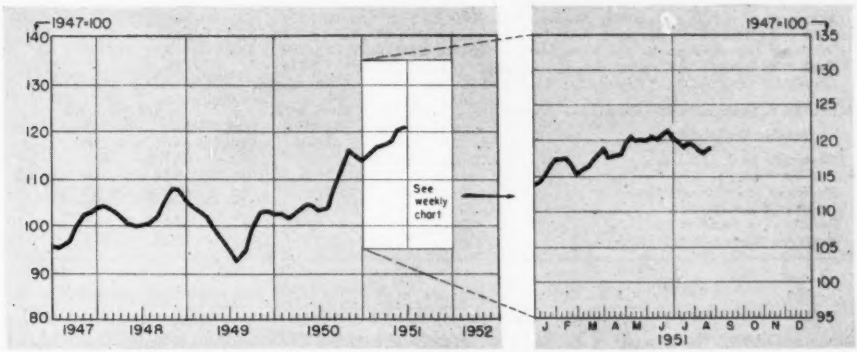
CHEMICAL MARKETS....



CW Index of Chemical Output—Basis: Total Man-Hours Worked in Selected Chemical Industries

Don't expect Italian sulfur production to mean much in easing the world-wide sulfur shortage. It won't. Output in Italy has slackened rather than increased, and the trend is not likely to be reversed for some time. Reason: obsolete equipment and labor strife both shackle sulfur mining.

Latest quarterly figures show a downturn in output from 538 thousand tons to 463 thousand tons.

And something else to consider: Less sulfur from Italy puts more pressure on U. S. exports, some 15% of U. S. production.

As long as the sulfur dearth continues, expansion of cellophane and most synthetic detergents will be curbed. The scarcity of carbon bisulfide hampers cellophane makers. Result: Right now they are running about a month behind in orders.

Detergents, says NPA, may not be able to grow at their lusty rate of recent years. Sulfuric acid is the bottleneck, as high-priority defense needs pre-empt more, leave less for detergent producers.

Nor will "replacements" be plenteous. Scarce polyethylene and vinyl chloride, dogged by other shortages and ticketed for defense uses, won't be available to backstop cellophane supply. And soapmakers admit soap capacity couldn't meet all requirements if synthetic detergents output were cut back to any sizable degree. Why: not enough production facilities, shortage of fats.

NPA concludes from its survey that sulphur is still the knottiest chemical shortage, but proffered rays of hope on supplies of other basic chemicals. On the NPA more-abundant list: benzene, chlorine, styrene, and some of the larger-volume plastics.

But naphthalene supply will remain on the skimpy side, as upcoming phthalic anhydride expansion tends to outgrow new production facilities for its raw material.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947 = 100)	119.8	119.3	108.2
Bituminous Coal Production (Daily Average, 1000 Tons)	1,696.0	1,668.0	1,817.0
Steel Ingot Production (Thousand Tons)	2,007.0	2,029.0	1,747.0
Wholesale Prices—Chemicals and Allied Products (1926 = 100)	139.9	140.0	121.7
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	254.7	255.4	184.2
Chemical Process Industries Construction Awards (Eng. News-Record)	$45,825,000	$16,554,000	$3,461,000

MONTHLY INDICATORS—FOREIGN TRADE (Million Dollars)	EXPORTS			IMPORTS		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	93.0	85.9	65.2	24.7	30.8	9.4
Coal Tar Products	7.4	7.0	3.5	4.2	2.6	1.9
Medicinals and Pharmaceuticals	27.4	26.6	19.8	0.9	1.5	0.6
Industrial Chemicals	17.5	15.2	8.2	9.7	13.4	2.1
Fertilizer and Fertilizer Materials	3.9	4.5	9.1	8.7	12.2	4.2
Vegetable Oils and Fats, Inedible	12.7	8.4	4.4	9.9	12.5	7.2

Strikes and natural disasters make the hunt for chemicals more strenuous for many would-be customers. The thirty-six day strike at Lion Oil Co. resulted in a decrease of nearly one third in its chemical sales for the first half of 1951 compared to the same period of 1950. Consumers' loss: many carloads of none-too-plentiful nitrogen chemicals.

One specific assessment of chemical plant damage by the Kansas flood is now on hand. Paul L. Davies, president of Food Machinery and Chemical Corp., estimates that his company's losses at Lawrence and Kansas City are around $400 thousand.

Another aspect: plant down-time of 30-60 days, depriving chemical consumers of phosphates and the company of anticipated revenue.

Although production upsets like these have far-reaching effects, an even more important factor for chemical supplies will be the increasing share that defense takes of U.S. chemical output. More and more, defense orders are leaving the paper stage to be transplanted into real production.

Harold Leventhal, counsel for the Office of Price Stabilization, expects that this heavier defense demand will mean higher prices—and soon. Reason: The Capehart Amendment will permit prices to rise to higher levels.

Another sign that the defense program is moving from blueprints and tooling-up into high-production gear comes from the Office of Defense Mobilization ruling, effective August 18, for a 60-day moratorium on rapid tax write-offs. The greater bulk of urgently needed production has already been stimulated to the tune of over $8 billion in new plants. Safe bet: New authorizations will face more stringent standards.

A few chemical companies were among those to receive NPA certification before the deadline. Some of their products: Anthraquinone for dyes, butyraldehyde and iso-octyl alcohol for plasticizers, and tetraethyl lead for aviation gasoline.

More production boosts can be expected even without the tax incentive, based on the continued growth of the civilian economy. Examples: Diamond Alkali's two-year doubling of chlorine-caustic soda output at Painesville, Ohio; Glidden's 20-25% expansion in lithopone pigment.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending August 20, 1951

	Change	New Price		Change	New Price
UP					
Rosin, WW, Savannah, cwt.	$ .046	$ .856	Carnauba Wax, No. 1 yel.	$ .08	$1.27
DOWN					
Oiticica oil, tanks	$ .005	$ .255	Tung oil, imp., tanks	$ .005	$ .365

All prices per pound unless quantity is state

READER SERVICE . . . .

HOW TO USE COUPON

Circle page numbers of items about which you want more details. Then write your name and address on the coupon at the bottom of the page and mail it to us. Your request will be forwarded to companies concerned, the answer coming direct to you.

MAKES IT HANDY

Products and literature in this issue are listed on these pages. There are three indexes. (1) Editorial items on new products, new equipment, new literature; (2) products advertised. (3) The index of advertisers is on the following page.

THE NUMBERS

Advertisements:—There is a page number on the coupon for each advertisement. Before the number, may appear, L, R, T, B (left, right, top, bottom), locating the ad on the page; small letters following (a,b,c) indicate additional products in the advertisement.

Editorial Items:—Numerals are page numbers; the ABC's distinguish among items where more than one is on a page. There is a number on the coupon for each item referring to new products, equipment, and literature.

EDITORIAL ITEMS

For more data, circle number on coupon

NEW PRODUCTS

Valite Resin 1366-M 20A

NEW EQUIPMENT

Chlorine Analyzer 24B
Sulfur Separator 24A

TECHNICAL LITERATURE

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Coating Materials 40C
Diethyl Succinate 40A
Hydrated Silica Solution 40B

EQUIPMENT

Centrifugal Mixer 40I
Centrifugal Sump Pump 40F
Low-Pressure Coupling 40H
Portable Conveyors 40J
Purifier 40D
Rubber-Lined Pipe Joint System 40G
Safety-Relief Valves 40E

PRODUCTS ADVERTISED

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Chemicals
- Ammonium acid fluoride T31a
- Aromatic 24
- Carbonate of potash 25c
- Caustic potash 25b
- Caustic soda 25e, 35
- Chlorine, liquid 25a
- Glycine N. F. B29a
- Hydroxylamine salts 6
- Industrial and agricultural, marine storage terminals I
- Industrial aromatics and chemicals B31
- Insecticide concentrates T29
- Lithium compounds T33
- Magnesium silico fluoride T31b
- Methione, feed grain 15-16b
- Monochloracetic acid B29b
- Paradichlorobenzene 25d
- Plasticizers
  - Primary T30a
  - Secondary T30b
- Pyrenone grain protectant 15-16a
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- Concentric 5f
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- Series 240A 5c
- Shell-and-tube 5a
- Style FH 5b

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Expires November 25, 1951

BOOKLETS . . . .

Chemicals

*Nitrosyl Chloride

80-p. book consisting of a comprehensive review of the properties and reactions of nitrosyl chloride, incorporates technical information on the chemical from over 700 references and abstracts. The Solvay Process Div., Product Development Dept., 40 Rector St., New York, N.Y.

Diethyl Succinate

6-p. bulletin containing technical data indicating the possibilities of diethyl succinate as a chemical intermediate for synthesis of ring compounds; properties and several reactions of chemical are described. Monsanto Chemical Co.

Hydrated Silica Solution

Bulletin devoted to "Syton C-30," a colloidal solution of hydrated silica in water for emulsion type waxes, water-based finishes, textiles, latex and other products; in addition to discussing the properties and various applications of the compound, the bulletin explains the effect of salts, electrolytes, acids and alkalies and outlines compatibility information. Monsanto Chemical Co.

Coating Materials

4-p. bulletin outlining the firm's services in paint, varnish and plastic coating fields; prices of analyses concerning physical qualities, chemical properties, permanence properties, toxicity tests and comprehensive tests are listed. Raymond C. Crippen Research and Development Laboratories.

Equipment

Purifier

4-p. bulletin describing operation, specifications and features of internal-type purifier, designed to remove entrainment from vapor and recommended for installations inside steam drums, flash tanks, evaporators, packed towers, bubble-cap towers, deodorizers and stills. V. D. Anderson Co.

Safety-Relief Valves

34-p. manual analyzing the economics of standard design practice in the line of discharge piping, offers operational and theoretical data to support the thesis that the design should be based upon elimination of back-pressure effects on tied-in safety-relief valves; manual gives information on firm's line of "Farriseal" and "Balanseal" valves. Farris Engineering Corp.

Centrifugal Sump Pump

8-p. bulletin covering firm's centrifugal sump pumps, in the wet and dry pit types, for handling clear liquids, sewage and other liquids containing solids; external and sectional views of the pumps are included as well as dimension and selection tables. Warren Steam Pump Co., Inc.

Rubber-Lined Pipe Joint System

Catalog and engineering manual for rubber-lined pipe joint system contains list of fittings and specifications plus a corrosion list noting conditions to which firm's gaskets and linings are resistant. Gates Engineering Co.

Low-Pressure Coupling

4-p. folder describing low-pressure wedge-lock coupling designed for connecting light-weight pipe in ventilating and similar low-pressure service; included is a table furnishing specifications on pipe sizes. Naylor Pipe Co.

Centrifugal Mixer

4-p. bulletin describing high speed centrifugal mixer—its advantages and its applications to such problems as those involved in mixing or dispersing polystyrene powders, glass fiber and plastic powder, prepared food mix, pigments, etc. The Safety Car Heating and Lighting Co., Inc.

Portable Conveyors

8-p. catalog covering firm's line of portable roller and wheel conveyors, giving specifications, explaining erection problems and illustrating various applications along with explanatory notes. The E. W. Buschman Co.

* Request must be made to company on business letterhead.

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